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THE NATURE OF CANCER

JOHN CLAY

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THE NATURE OF CANCER

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Suggestions for a New Treatment

By
JOHN CLAY

WITH DIAGRAMS AND ILLUSTRATIONS

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Dedication

TO MY FIRST PATIENT

WITHOUT WHOSE EARLY CO-OPERATION
LATER SUCCESS WOULD HAVE BEEN IMPOSSIBLE
THIS WORK IS AFFECTIONATELY DEDICATED
BY THE AUTHOR

PREFACE

THIS small work was originally intended to be simply a report of the results obtained from my treatment of Cancer with some statistics in connexion therewith for the twelvemonth ending September 1908. With increasing knowledge and experience the subject matter has grown until the work has broadened out to its present form and dimension.

I have always contended that the discovery of an agent for the extirpation of Cancer would be sure to elucidate the difficulties surrounding it to a much greater degree than the efforts made to find out its cause, even if these proved successful. Continued success in the above direction confirms this contention, and also gives hope that one is on the high road to a much greater success than that attained, namely the prevention of cancer formation altogether.

The increase in the number of deaths from Cancer is somewhat alarming; for the years 1881–5 it was 0·55 per thousand of the population living, for 1901–5 it was 0·86 and for 1908 it was 0·92, the highest figure recorded. The Registrar-General

says: "This country occupies an unenviable position with regard to the mortality from Cancer, the rate in England and Wales being exceeded in only two European countries, namely Switzerland and the Netherlands."

There is no doubt that the medical world is staggered by its inability to deal with this growing evil. The only palliation at its disposal in cases of malignancy is the prescription of morphia or kindred drugs, and hiding the trouble as long as possible from the victim —perhaps the best course to follow under the circumstances. But when a new system is adopted which promises success this course of conduct will be quite revolutionized and every possible effort will be made to point out the danger of delay in taking steps to fight the evil.

In criticizing the various methods hitherto adopted of dealing with malignant growths I have not only endeavoured to be fair but also sympathetic, recognizing in all of them a sincere, if often futile, attempt to combat one of the most insidious foes of human life. And as far as the use of the knife is concerned I believe that the best surgeons would gladly welcome another alternative to it. Operations of many other diseases will always be necessary, but the repeated failure of the knife in Cancer creates a prejudice against it in those cases in which the surgeon has every confidence in its success. Its repeated use and its

undoubted aggravation of the evil in so many cases of cancer has led to its abandonment in this direction by many physicians who believe that leaving the growth to have its own way is preferable to and often a less evil than an attempt to destroy it by this means.

Some objection might be raised to my lack of the usual medical qualification in taking up this work. The table of results at the end of the work is my only justification. Where the trained members of the profession admit failure it is surely competent for any one to save life. There is this to be said in further extenuation, that although in operations the percentage of loss of life is fairly large through the operation itself, in my treatment, already applied to some hundreds of cases, and in many instances where the danger would be too great to use the knife, no fatal result has followed.

I have not had time to go over the wide range of literature specially devoted to Cancer and kindred growths. I have taken advantage of Dr. Williams' *Natural History of Cancer* and several surgical works. The former is a most useful compendium of general information, and I have used his statistics bearing upon the subject.

The writing of this work has covered a period of over twelve months; during that time the treatment has undergone changes and improvements which have led to developments and modifications of one's

knowledge and theories of the subject, theory and practice reacting on and influencing each other. As a consequence of this the matter has been subjected to various alterations, some interpolations have been made. These may have led to a want of harmony and in some instances to an apparent contradiction which could only have been avoided by rewriting the book.

The chief theory I have followed out is that Cancer is due to excessive proliferation of the normal cells of the tissues. This was not generally held twelve months ago, now it seems to receive more general acceptance. The difficulty of transplanting cancer from one person to another or from one part of the body to some other part of the same individual has been recognized for some time. The obvious corollary to this, namely that there must be the same resistance to its auto-dissemination or that in the normal condition the body is to some extent cancer-proof seems to have escaped attention.

This is to me one of the most interesting and hopeful features in connexion with this painful subject, and encourages one to hope that preventive agencies may be found not only against the beginning of the evil but also against the formation of metastases or secondary deposits when primary growths have formed.

With regard to the theory that pyogenes or some other extraneous germs break down the resistance

mentioned above or lead to harmless growths becoming malignant through secondary complications being induced by their agency, it may be too soon to accept the data to hand as conclusive. I am of opinion, however, that either this or some similar theory will in the end be adopted as the correct one. [The presence and activity of these germs in connexion with advanced ulcerated cases has diverted students of this subject from the true origin of cancer, and led to the adoption of the erroneous opinion that this origin was parasitic.]

In the list of successes the cases are nearly all cleared of growth, there are some in which there is still a little trouble. In Mr. Winskill's case after two operations and a recurrence for a third time, especially when it had spread to the glands of the face, nearly five years from its first commencement, to have kept the patient alive for two to three years is far more remarkable than to have quite cleared an early growth. The same may be said of Mr. Boydell, who nearly three years ago after being operated upon by the surgeon, half of the tongue being removed, was told that he could not possibly get better, yet they are both nearly well and give promise of complete cure. I hope that I am mistaken, but I am afraid that two similar cases of prolongation of life could not be found by means of any other treatment. It must not be assumed that the list exhausts the

successes; there are many more which will shortly be added to it.

It is surprising what a large number of attempts to extirpate cancerous growths have given promises of success and have then gradually failed when applied on a larger scale. It is satisfactory to find the one under discussion gives every indication of the opposite to this, increasing as it has from the beginning in effectiveness, growths now disappearing under it with comparative ease, which two years ago it would have been impossible to remove, or if then disappearing doing so with the greatest difficulty.

In acknowledging the help I have received I must place first the sufferers who have come for treatment: without them nothing could have been done. Those who have been treated successfully are naturally grateful, but even those whose cases were too serious to be successful, and from whom one might expect some expression of dissatisfaction have on the whole expressed their appreciation of the treatment and the attempt to give relief, in a way that has been most touching. Many of the leading papers have helped me by giving prominence from time to time to the results which have been achieved and have thus brought the treatment to the notice of many sufferers. My daughter has given me invaluable help, especially in revision work. In reproducing the sections by the process of microphotography; considering the difficulty through some

of the sections not being hard enough, Professor Flatters of Manchester Technical College has been very successful and the contrasts are good.

My publishers too have been very kind and painstaking in the extra trouble which an outside work of this description has entailed.

Four of the plates are from sections which were in my possession, the remaining eight are those of growths from my own cases.

JOHN CLAY.

Birchfield Villas, Hebden Bridge,
January, 1910.

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CHAPTER I

A monster seated in the midst of men
Which daily fed is never satiate.
Dante, translated by Green.

With the exception perhaps of consumption no question has aroused such widespread interest as the Cancer Problem. The Cancer Research Committee endowed with ample funds has for years been making extensive experiments, and has compiled and issued voluminous reports of them with a view of arriving at an elucidation of the difficulty. In the summer of 1907 an International Conference of Medical Men of the highest standing from all parts of the world was held at Berlin to discuss it, England alone of the leading countries refusing to take part in the Conference. Our hospitals, infirmaries and medical schools have been centres on which has been brought together and focussed every piece of information which could throw any light on the subject. Especially may this be remarked concerning the work of the Middlesex Cancer Hospital. The reports of the work of this institution may be considered classical, extending as they do over a period of 117 years, and show

an amount of deep observation and patient investigation which well merit a greater degree of success than they have yet obtained.

The remedies suggested by medical and non-medical men are beyond compute; some have promised success for a time, but this promise has yielded in the end to miserable disappointment. To read through an exhaustive book such as that lately published by Dr. W. R. Williams on *The Natural History of Cancer* leaves the mind more troubled than the effects produced by the most horrible nightmare. It is, however, a stupendous tribute to the zeal and perseverance of those who have worked so untiringly with a view of destroying this pest.

One alarming fact in connexion with the subject of cancer is its remarkable increase. The Registrar-General's first report was published in 1839 and was brought up to June 1838; in this the death rate from cancer was given at 166 per million of the living population, that for the year 1905 gives 885 deaths per million, an increased rate of over fivefold, the popular feeling that cancer is on the increase being thus confirmed by reliable statistics, even if allowance has to be made for a more effective and careful diagnosis, giving growths now as cancerous which would formerly not be considered malignant in their character. This is a startling comment on the so-called improvements in modern surgical methods,

but as the surgeons themselves recognize their impotence one is compelled to sympathize with them in the impasse to which they are driven rather than to express condemnation at the futility of their efforts to obtain the desired solution of the problem. Multiplying this number 885 by 40, which is in round numbers the number of millions constituting the population of these islands we get a total of 35,400 as the yearly number of victims to this terrible scourge. The insatiable maw of the monster Minotaur was justly dreaded by the Athenians of old, and whilst writing these lines humanity is being staggered by the reports from Messina and Reggio of the dreadful effects of earthquakes and tidal waves, yet what are these in comparison with the effects of cancer? The above loss from cancer is in these islands alone; if to this were added the loss in other countries where its incidence is equally severe, what a dreadful total the result would be—and this is not a mere sporadic disaster, but represents the annual toll of human life paid to this monster.

It has been claimed for the uncivilized races that their immunity from the scourge is greater than that amongst civilized people, but more exhaustive inquiries tend to contradict this opinion. Nothing short of correct statistics, however, will clear up the matter; very probably some proportion of the great increase amongst ourselves is due to a greater knowledge as

to the real character of the evil, deaths being now attributed to these growths whose causes formerly were not understood. It is also certain that in all countries the general failure to understand the widespread nature of cancer is largely at fault, the patients themselves through a natural dislike to its being known that they are victims to so foul a foe, contributing by their secretiveness to this general misunderstanding, so that had we not the official figures as a guide, it is easy to see that the estimate would fall far short of the actual numbers. This being the case, we can understand that amongst savage tribes whose habits are mostly nomadic, a more reduced estimate will be the result than would be the case if statistics were as available and as reliable as they are in civilized communities. Widespread and general as the attack of cancer generally is amongst the human race, the field of its operations is even farther reaching than this. All the other vertebrates are believed to be liable to it, rats and mice especially, birds and fishes also fall a prey. It is a case of this "one" foul "touch of nature makes the whole" vertebrate "world kin." The lower organisms are not free; even the vegetable world often succumbs, as the excrescences which sometimes appear on trees, especially where the latter have been cut or injured, are the equivalent of cancer in animals, often leading to the total destruction of the plant affected.

It literally decimates the mature population of these islands since more than one in nine of the deaths occurring over the age of thirty-five years is due to this cause. No one is certain of escape, since it comes with equal tread to the cottage of the poor and to the palace of the rich, and makes no discrimination between the healthy and the weak. In any assembly of nine hundred people above the age just mentioned, according to the law of averages one hundred of these will fall victims to this scourge.

The great increase not only in proportion to the increase of the population but also *pro rata* per million of the population living has been so great and continues to increase at such a rate that one popular writer has ventured to predict that if no efficient remedy is found at an early date, the whole of the human inhabitants of this planet will soon be swept away by its ravages. Some two years ago the Government contemplated the appointment of an Imperial Commission to inquire into this dreadful subject, but acting on the advice of experts it was abandoned. There is no doubt that the fear of the effect the naked bald truth in regard to cancer would have on the public generally is paralyzing inquiry.

The Germans have shown us a better example. Their system of issuing pamphlets broadcast showing the danger those run who neglect the " small lumps " that appear, has worked so well that the fatality in

Germany from cancer has been considerably reduced. The attempt to keep our people in ignorance is a fatuous one. Our medical men, at least a large number, act on the belief that "where ignorance is bliss 'tis folly to be wise," and very often not only leave the patient, but even the patient's friends, ignorant of the true character of the evil until almost the very last.

CHAPTER II

Quae te nunc coquat, et vexet sub pectora fixa ?
Cicero de Senectute.
What now lies boiling in thy troubled breast
And will not suffer thee to be at rest ?
From Montaigne.

WHAT is Cancer ? This question is often asked by sufferers and sympathizers, a question easily asked, but a most difficult one to answer. Apart from its pathological significance, which is by far its most serious one, it is a problem of a most interesting nature to the biologist. It is perhaps due to its special biological character being wholly or to a great extent lost sight of, that failure has marked the efforts to kill or remove the pest. Speaking from the pathologist's standpoint, cancer is not a case of any organ of the body failing in its action ; this may ultimately result, but if this takes place, as we shall see later, it is altogether as a secondary effect. The growth may develop for weeks or months, in some cases it may be for years, and every organ in the body be performing at the same time regularly and normally its proper function and the general health of the body

be altogether undisturbed. It is this practical immunity from pain, this minimum of disturbance to the general well-being of the body that characterizes the early stages of this insidious foe, which makes it difficult for any one subject to it to realize at first the danger which threatens. There is no doubt that the medical adviser is often deceived and misled in his diagnosis in viewing the growth as a pathologist. He is often called in at an early stage, he is afraid of pronouncing the growth malignant, it has to be nursed and examined from week to week until perhaps a stage is reached beyond which a successful treatment is impossible, either by means of the knife or any other agency.

With the increased perfection of the microscope and the stimulus given thereby to the science of biology, especially in the department of embryology, a more minute and detailed knowledge of all organic life, both animal and vegetable, has been obtained. Instead of the tissues of the body being formed, as was formerly believed to be the case, of homogeneous indefinite matter, we now know that these either consist of, or originated, as cellular components persisting like the original cells, or modified by pressure or other causes. Thus in the human body, instead of a single unit we have colonies or aggregations of unicellular organisms which form the various nerve, bone, muscle, connective epidermal and epithelial

tissues, and all these cells have originated from a single primary cell or ovum, which through the action of a certain fertilizing stimulus has divided, and the new cells by continuing the process of multiplication by division, and by suitable modification have developed into the fully formed human body. The blood itself is largely made up of cells, the more numerous of which are the red cells, and the less numerous the white cells. The shape of the former is fixed, but that of the latter is constantly changing, this change being known as an amœboid movement. In ponds a unicellular organism named Amœba is found, this small animalcule resembling the white corpuscles of the blood in general characteristics, and like them having the power of altering its shape by this amœboid movement,

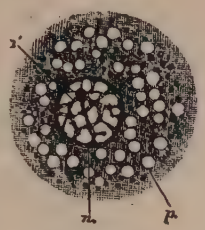

FIG. 1.—Diagram of a cell (after Schafer).

p, protoplasm with vacuoles and granules; *n*, nucleus with intranuclear network; *n'*, nucleolus.

The cell contents consist of a mass of soft granular matter named protoplasm, embedded in which is a smaller somewhat denser mass, the nucleus, in which is a still smaller body the nucleolus. The amœba and the white corpuscles of the blood are without envelope, but the ovum has a firm membrane in which the cell contents are enclosed. It is in the

nucleus of the cell that changes take place which lead to cell-division and multiplication, these changes being especially characteristic of the early embryonic cells which increase in number at a very rapid rate, the cells ultimately forming three special layers known technically as the epiblast, the mesoblast and the hypoblast. Each layer gives rise to certain definite tissues of the body; amongst others the epiblast gives rise to the epidermis, the epithelium or lining of the mouth and the glands connected therewith and the tissues of the nervous system. From the mesoblast spring the muscular tissues, the connective tissues, the blood corpuscles and epithelial lining of some of the internal organs, whilst from the hypoblast arise the epithelium of the whole of the alimentary tract and all the glands which open into it, the epithelium of the larynx, trachea, bronchi, and the

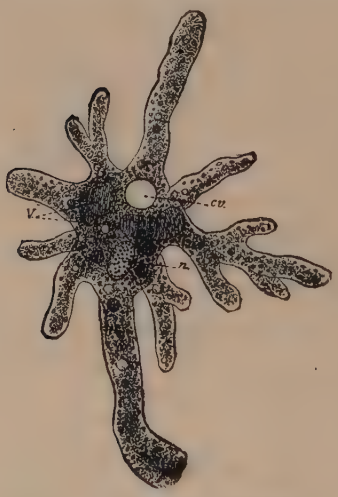

FIG. 2.—Amœba Proteus (after Leidy).

n, nucleus; *cv*, contracting vacuoles; *v*, food-vacuoles with protoplasmic contents.

epithelium of some other internal organs. It may be asked, "What is the stimulus and co-ordinating agency through which this cell multiplication takes place, and by which each cell falls into its predestined place, the ultimate result of which is the perfected living human body, and what is the inhibitory force which restrains this cell activity, allowing it again to

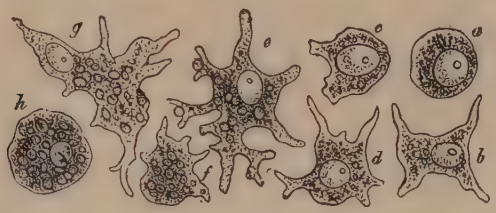

FIG. 3.—Phagocytes or blood-cells that eat (after Haeckel). From the sea snail.

These phagocytes closely resemble amœba. In the human blood they have been termed the police cells, seizing on foreign injurious matter they absorb and digest it, thus acting as scavengers.

come into play for renewing the tissues or repairing in some cases injured parts?"

It is no answer to this question to say that it is a consequence of the law of development, built up or formulated by a succession of similar cases of growth extending through an indefinite period, and therefore become hereditary. No, there must be some persistent cause, chemical or physical, which the biologist has not yet laid hold of nor determined. The power of renewal of parts in man and the higher animals is

lost or very limited; as we descend this power is more extensive—thus in the lobster a lost limb can

FIG. 4.—Common large corpuscle of the newt. *a–h*, successive forms assumed by the same cell in the course of an hour, in a preparation enclosed in oil, without the addition of any reagent.

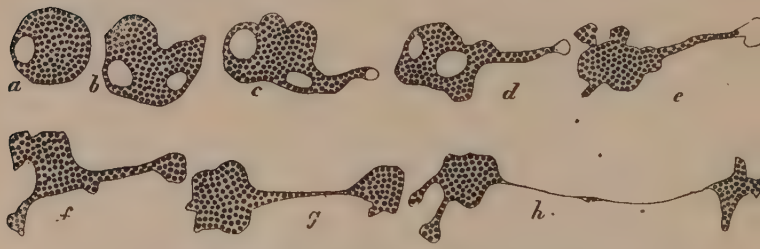

FIG 5.—A granular corpuscle in the same preparation. *a–h*, successive forms assumed by the same cell in the course of fifteen minutes.

be wholly restored and the whole integument is renewed yearly; still lower we come to the Hydra, a small animal consisting, roughly speaking, of a double

layer of cellular tissue. This may be cut up into any number of small pieces, each piece having the power

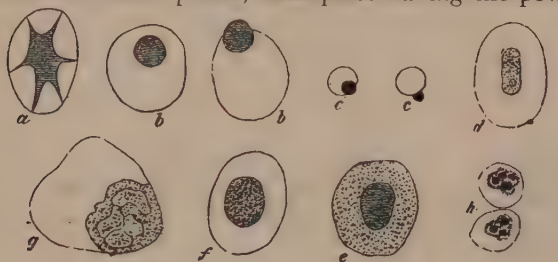

FIG. 6.

a and *b*, coloured blood corpuscles of the newt after the addition of 2 per cent. boracic acid.

c, coloured corpuscle of human blood after the addition of a 2 per cent. tannin solution.

d, coloured corpuscle of newt's blood after the addition of dilute acetic acid.

e, the same treated with water and then CO_2 added.

f, the same; a small quantity of CO_2 has been added to it, after it has been made pale by treatment with water.

g, colourless corpuscle of newt's blood after the addition of dilute acetic acid.

h, colourless corpuscle of human blood after the addition of dilute acetic acid.

to reproduce an organism similar in all respects to the original or parent Hydra.

These facts suggest the inference that cell proliferation and activity are a sign of degeneration, seeing that they are characteristic of the less rather than the more highly developed animals.

It may seem a far cry from these elementary radical biological facts to the question "What is Cancer?" but some

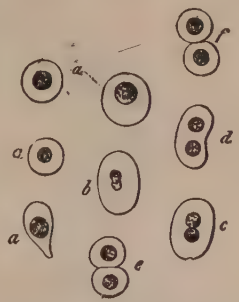

FIG. 7.—Blood cells dividing by direct division from the blood of the embryo of a stag.

knowledge of them is necessary in order to obtain an understanding of an answer to this question which modern research gives.

In such diseases as typhoid, tuberculosis or cholera a foreign microbe enters the body and sets up irrita-

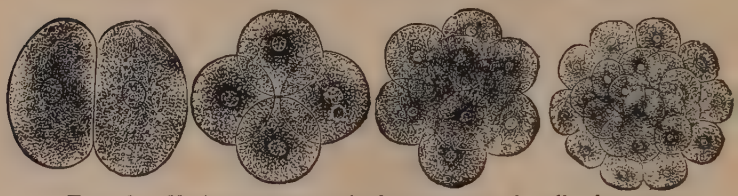

FIG. 8.—Various stages of the process of cell cleavage.

tion and disturbance, which if not removed ends in death; each of these diseases has its own specific germ, easily recognized under the microscope. But in the case of cancer it is very different—it is a deadly

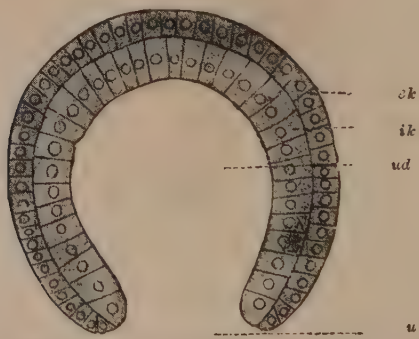

FIG. 9.—Gastrula of Amphioxus lanceolatus—here the ovum or primary cell has proliferated, forming gastrula or cup-shaped embryo. The Amphioxus is the lowest of the vertebrata. *ek*, ectoderm; *ik*, intoderm; *ud*, primitive gut.

illustration of the old saying "A man's foes shall be they of his own household." We have already seen

FIG. 10.—Hydra—a diagrammatic longitudinal section with fully formed bud which will later separate and form independent young hydra.

how the body is built up by cell-proliferation, how this becomes arrested when each cell has taken up its

resting place, and we have indicated that some restraining inhibitory force is keeping this further proliferation in check. Whatever this force may be, in the growth of cancer it must be suspended for a time or destroyed. This may be done by means of a blow, mental worry, a lowering of the tonicity of the system, in the case of cancer of the tongue abrasion by jagged teeth, of the lip by a dirty pipe,

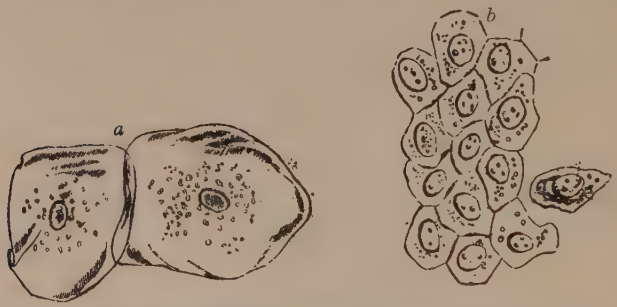

FIG. 11.—Epithelial cells (*a*) from the inside of the mouth. (*b*) pavement epithelium from a serous membrane.

or by other things injurious to some local tissue. Whatever the cause the inhibitory force holding the activity of certain cells in check is disturbed or destroyed and this cell activity is resumed, and from these cells malignant cancerous tissue may begin to develop. It must be remembered that the cells we are referring to are of a very microscopic character varying from $\frac{1}{2000}$ to $\frac{1}{3000}$ of an inch in diameter. This is why cancer in its origin is so

insidious; the diseases already referred to, caused by the entrance of foreign bacteria, soon make the patient uncomfortable and compel him to seek the prescribed remedies, but cancerous growths form and may become far advanced and the person attacked be in complete ignorance of their existence. Especially is this true of the metastases or secondary deposits which will be explained later. The writer has several cases in mind where patients have come with cancer in the breast and have been surprised when a careful examination has revealed these secondary growths in the axilla, on one or both sides of the neck, and other places, whose existence had hitherto been entirely unsuspected.

The microscopical stage of cancer is soon passed, and the growth is generally felt as a small insignificant lump varying in size when first observed from that of a pea to that of a walnut, the further increase in size being slow or rapid according to its nature, one fact being sure, namely that the tendency is always to increase in size, never to reduce.

One theory of the origin of cancer is the twin-cell theory; we have seen how the ovum or embryo-cell by proliferation gives rise to cells which ultimately build up the whole body; the twin-cell advocates believe that in cases of cancer there have been two such cells, that one of these develops, forming the perfect body, and that the other remains quiescent

and unchanged, resting in some part of the body until such time as a special stimulus excites it to action, when it begins to proliferate and develops into cancerous tissue.

FIG. 12.—Connective tissue corpuscles.
(*a*) (*a*) flattened and branched; (*b*) ramified connective tissue.

This theory, beautiful as it is, has not yet been supported by any proof; it has probably been suggested by the cambium in trees. The active proliferating

cells are at the ends of the stem and the branches. In dicotyledons the cells of the former leave behind them a ring of fresh succulent cells from which the yearly ring of new growth develops. Any injury to the trees is generally formed from this ring, which is called the cambium ring, but if this injury is cut off from the cambium, the ordinary cells in its neighbourhood begin to proliferate and by this action make good the injury. From this we may fairly infer that the function of cell proliferation is not necessarily lost, even when the cells have for a considerable time remained stationary; and therefore from analogy between vegetable and animal cells there is no need to bring in the embryonic twin-cell theory to account for the origin of abnormal growths in the animal economy. Although we may therefore look on the normal cells of the tissues as the nidus of these growths the growths themselves may be considered parasitic in their nature; they live at the expense of the local ordinary tissue, and weaken the body generally. Some patients state that the effect on the body at the beginning of the growth has been as exhausting and troublesome as are the effects of early pregnancy. In lower forms of life, in addition to the sexual means of propagation there is an alternate asexual form. following up the twin-cell theory already referred to. Dr. Beard develops this and maintains that these semi-foreign tissues are really a degeneration –a

harking back to the alternate asexual form of life manifested by rudimentary animals and plants. If so, the above effects would be a natural corollary to such an abnormal conception. In some forms of life, and especially in the lower plants, there is a dual life known as symbiosis; host and parasite by a system of mutual accommodation adapt themselves to the necessity of the economy of their joint life and maintain a prolonged existence, but in regard to cancer and its human host this mutual accommodation is impossible. In the prothellus of the fern, which is the asexual form of this plant, the young fern finds its nourishment and obtains life and strength at the expense of the former. In the case of cancer, however, this process is entirely reversed, the low form of organism first gnawing away the tissues and ultimately destroying altogether the more highly developed life in which it originated. One interesting question in connection with cancerous formations is as to whether the cells and tissues forming them are degenerate and are not only a lower form in themselves than the original tissues, but whether their appearance is a sign of degeneracy locally where they arise, and also in the body as a whole. With the present knowledge of the subject the answer is a difficult one; probably on the whole it would be in the affirmative. Broadly speaking the age of thirty-five is the period at which the body is liable to become

a prey. Cancer instances are met with at a considerably earlier age than this ; the writer has met with them at fourteen and even as early as nine years of age, but this is quite exceptional and the higher figure may be taken as indicating the commencement of the period most liable to attack, the danger increasing with advancing age.

The following table from the report of the Registrar-General of the deaths from cancer in England and Wales during the year 1900 throws some light on the subject.

TABLE I

	Under 5 years.	5	10	15	20	25	35	45	55	65	75	85 and upwards.	All Ages.
Males .	61	21	36	47	83	235	748	1942	3245	2832	1095	110	10·475
Females	58	38	32	53	73	502	1803	3539	4509	3799	1641	199	16·246

This and the following table quoting from Dr. Williams' work, who says concerning the above: "These data tell us very little as to the relative tendency of each sex to cancer at different periods. In order to ascertain this, we must compare the figures with the total number of each sex living at the corresponding age periods. The following table, which has been compiled on this basis, shows the mean

cancer mortality per million living of each sex, in groups of ages, for the year 1900."

TABLE II

SHOWING THE CANCER DEATH-RATES IN EACH SEX AT DIFFERENT AGE PERIODS FOR 1900.

	Under 5 years.	5	10	15	20	25	35	45	55	65	75 and upwards.	All Ages
Males .	31	11	20	29	60	101	418	1483	3796	5735	6715	672
Females	29	20	18	32	47	197	942	2433	4561	6254	7468	975

These tables show the highly increased death rate due to this cause as the age gets beyond the thirty-five years limit, and lends support to the theory that cancer originates in tissues which are degenerating, though this is modified by further investigations made by Dr. Williams, who examined the death rate among 1,087 centenarians and found that of these only five died of cancer.

If this degeneracy of the tissues were proved to be the cause of cancer growth it would also explain why a blow gives rise to it, since this would have the effect of interfering with the blood and serum supply to the part affected and thus reduce the normal healthy condition of the surrounding cells.

A question freely discussed in connexion with the

cancer problem is whether cancer is local or constitutional in its origin, that is, does it affect a definite restricted area, and the rest of the body be free from the attack, or is the restricted early appearance at some particular part of the body due to a yet undiscovered virus which is permeating the whole system and which first appears at some weak spot? There are a good many arguments in support of the latter theory. Mention has already been made of the similarity in condition of the early stages of pregnancy to that where cancer makes its early appearance. The now admitted failure of the knife as a cure in cutting out malignant growths is put forward in support of this view, and the general anæmic condition of the body is evidenced as further support. Yet in spite of these facts from close observations made on some hundreds of sufferers the writer confidently supports the theory that the origin of cancer in the great majority of cases is purely local in its character, and that claiming it as constitutional is an inversion, a mistaking the effect for the cause. Although in the case of pregnancy constitutional debility may accompany it, every one would admit that the trouble is quite local, though the incidental effects may be general or constitutional. The failure of the knife in operations, as will be seen later, is due rather to its unsuitability for the purpose than to the elusive and widespread nature of the growth.

But when the evil has become so great and diffuse that it may be considered constitutional, other complications have arisen in addition to the scattered formation of the secondary deposits, such as the lowering of the tonicity of the system by the absorption into the blood of poisonous exudations from the elder or primary growths.

It may be said here that the health condition of the patient is often a good barometer for indicating the course of progress made in the destruction of the growth by a method to be described later, this when accompanied by a good appetite and by natural sleep as a rule confirming a more favourable diagnosis.

A matter of much concern to people who are living with those suffering from cancer is as to whether the evil is infectious or contagious in any way, and may thus be classed with tuberculosis, typhoid, cholera, and other diseases which arise from and are propagated by means of their characteristic bacilli.

In support of this view, the evidence is somewhat weak. It has been claimed that there are so-called " cancer houses " where as many as eight cases have been known to die of cancer. It is also claimed that one member of the family has given the evil to another member. But these cases when closely examined appear to be mostly coincidences and nothing more, and favoured by the natural instinctive repugnance which is felt towards an ulcerated open sore, and

towards an evil the origin and character of which is so little understood and on that account to be dreaded, it is assumed that the trouble is infectious. On the other hand the difficulty of transmitting cancer has been repeatedly demonstrated; cancerous cells have been in many cases removed from one person and inoculated in another and have died down and left no evil effects. There are thousands of cases in the hospitals attended by nurses and medical men—the writer himself has been brought into close contact with hundreds during the past two years—and from these no ill effects have been known. Cancer cells have been transplanted from the human subject to the bodies of rats and mice, but in these instances the normal cells surrounding the cancerous cells have had to be conveyed along with the latter or these have died down in their fresh position. Correlated with this aspect of the question is the one of heredity. It is often assumed that because mother and daughter have often both had cancer that it has been transmitted to the latter from the former, and that because it is so common in certain families as to become almost characteristic, that it is due to some strain running through them, generation influencing generation successively in this direction. But even in this respect the argument on the opposite side is so strong as to destroy the above assumption almost altogether and make it impossible of belief. In the

first place the trouble as a rule does not appear in the children until late in life; if the evil had been already handed on by the parent, one can see no reason why it should not at once develop. Further, children have been born of cancerous mothers, and have even been suckled from cancerous breasts, without evil effects manifesting themselves. Two instances where primary and secondary growths of a most malignant and extensive kind had developed on the mothers and both of whose lives were despaired of, have come under the observation of the writer within the past six months. In one case the offspring was fine and healthy and is still living, in the other it was puny and weak, and now dead, yet both these children were quite clear of any abnormal growth. Again any one dealing with a large number of these cases comes across so many who state that they are the first known victims in the family of such a complaint, which considerably weakens the case in favour of its being hereditary.

Although therefore it is improbable that cancer is directly transmitted from mother to child or from father to child through the mother, it is quite possible for the principle of heredity to operate in the way of influence and tendency, for whatever may be discovered ultimately as the cause or conditions which predispose to or favour atypical or abnormal growths, we can safely assume that such conditions or pre-

disposition will be handed down from parent to offspring. So that although from the nature of the case the evil may not itself be propagated directly, the above conditions may indirectly be the means of giving above an average rate of incidence in certain families.

Some years ago the parasitic theory of cancer was strongly held. We have seen how it becomes to all intents a parasite though originating in the normal cells of the tissues, but those who held the above theory maintained that it was *ab initio* parasitic and due to some extraneous germ introduced into the alimentary system and thence by the blood to the tissues or by some other means, and there living at the expense of these tissues which they to some extent simulated, they multiplied and formed malignant growths. It was reasonably argued that if this parasitic germ could be detected and isolated some toxic remedy could then be found which would destroy it. This led to experiments on a large scale with low unicellular organisms covering a wide range.

One of these we might take as an illustration or type of the rest, namely Torula the common yeast plant. It is a small microscopic cell varying in diameter from $\frac{1}{2500}$ to $\frac{1}{7000}$ of an inch, differing from Amœba in this respect, that the cell has a coat of hard cellulose. It multiplies at a rapid rate when placed in a suitable solution, a single cell being capable of

reproducing itself millions of times, this power of reproduction being held in suspension when the food is exhausted. It exists singly in detached units. It also forms rouleaux or colonies strung together. Though differing in its external envelope from Amœba it resembles it in its contents, these being granular protoplasm, with an enclosed nucleus. Like Amœba the reproduction of new Torulæ depends on changes which first develop in the nucleus. It is said that this power of reproduction is held in check by the presence of oxygen in excess. It was of course out of the question experimenting on human beings with Torula and other single-celled units—these were tried on rats and mice by introducing them into the blood. The effect was somewhat serious, death in many cases supervening in a very short time. When a post-mortem examination was made it revealed the presence of small nodules in various parts of the body, those in the lungs resembling the secondary deposits often formed there in human beings from ordinary cancer. In some cases actual external growths appeared which caused very little inconvenience; these grew for a time but afterwards dwindled away without leaving behind any trouble, the animal infected living on in a normal condition.

The experiments thus carried out with Torula and other unicellular organisms produced barren results as far as identifying them with cells forming cancerous

tissue was concerned, or in proving malignant growths to be fungoid or microbic in character. But although actual identity was disproved similarity in proliferating capacity was established, and consequently the degenerate character of cancerous cells was made clear.

The somewhat vague word tumour—literally a swelling—has generally been used to cover the various abnormal or atypical growths of the body. Under this head they have roughly been divided into two kinds, malignant and non-malignant or benign tumours.

Within this classification have been included warts, papillomata and other bodies such as cancers of the most malignant type. Although the term may not be the most suitable one, the attempt to generalize these growths under one group is quite scientific, the underlying cause of all of them being due to excessive cell proliferation or redundancy at some localized centre which makes them fundamentally alike. Objection may also be raised to the division of tumours as above into malignant and non-malignant. It is highly probable, however, that all of them are potentially malignant ; even an apparently harmless wart on the lip after having been forcibly pulled out has assumed a malignant character, the whole lip becoming affected and showing signs of rodent ulcer.

Tumours of the non-malignant kind are generally

encysted, the soft celled interior being surrounded with a hardened outer layer of firmer and more compact cells; their growth is often very slow. Cases are familiar where they have existed for a period of thirty years without much inconvenience, although these are exceptional.

Tumours of a malignant character include cancers, the Latin word cancer signifying a crab, the tentacles of this animal being supposed to have some resemblance to the branches or extensions of this kind of growth. In fact, although perhaps not strictly according to the most scientific definition, the term cancerous is now popularly and broadly speaking applied to growths which are of a malignant or dangerous character.

These again may be subdivided into sarcoma, or growths which affect the tissues under the skin, and carcinoma or epithelioma, which originate in the soft tissues lining the mouth, tongue and throat, and the lining of other parts of the body.

It is characteristic of each of these growths that the cells constituting them resemble those of the tissue whence they originate. If the epithelioma originates in flat-celled, columnar or round-celled tissue the growth varies according to these modifications. If the sarcoma arises in fibrous or connective muscular or fatty tissue, the cell constituents of the growth are likewise varied, though after a time the

variation in the different types of growth may be reduced and the two approach each other in similarity.

We have previously seen how cancer is from the size of the cells which have first become malignant necessarily microscopic in its origin, and the small difference between the one or several cells which marks the beginning of the trouble and the remainder of the tissue must be extremely slight, and therefore when the growth is apparent to the touch a comparatively large development must have taken place. This is now the period of trouble, anxiety and uncertainty. If wise, the patient seeks advice, although perhaps by taking this step the uncertainty is increased, for if cancerous the prospect is so serious that the medical adviser hesitates in giving an opinion. Sometimes the small lump passes away, if it be an abscess or harmless swelling. Observation is kept up, if the growth is malignant valuable time and irreparable opportunity has thus been lost. Sometimes the fear of an adverse opinion keeps the prospective sufferer silent. The mischief is there however; its rate of growth may vary, but it gains in magnitude. If it is in the tongue it ramifies until the whole organ becomes rotten and fungoid. If it is in the breast it gives shooting pains as the growth proceeds and attacks the other surrounding tissues. All these tissues may be destroyed, the breast being replaced entirely by cancerous formation. This may become

closely adherent to the bony tissue of the ribs, infecting them and eating through them to the heart or lungs. The growth may be restricted and localized in the area it first involves for a long time. The writer is familiar with cases of this kind in the mamma of over twenty years' standing which have simply enlarged *in situ*. These cases are, however, exceptional; as a rule, sooner or later secondary deposits, technically known as metastases, begin to form. These constitute perhaps the gravest danger in connexion with cancer. The general opinion in explanation of the formation of these secondary growths is that loose cells from the primary growth become detached and carried away by the serum or the blood current to other places in the body, and being there deposited form centres of fresh growth. Sometimes the metastases become more malignant in their character than the primary growth, and in turn from them are formed other metastases until the whole system is infected. From the tongue these secondary growths involve the large salivary glands and the smaller glands of the neck and face. From the breast the glands of the axilla or armpit and those of the neck are first infected. They radiate from the uterus to the large glands of the groin on to the glands in the abdominal cavity, infecting in time the rectum also.

To show how seemingly innocent growths may be the foci from which malignant metastases may radiate,

the following cases may be taken as illustrations. Two patients with apparently small harmless growths on the muscles at the base of the skull, existing there for years, were attacked the one with a malignant cancer on the side of the neck, the other with epithelioma of the tongue, thence again spreading to the neck and the glands, and all about both sides of the face. Another had for a long time a large apparently harmless tumour springing from the scalp which was succeeded later by a growth in the rectum. In a fourth case where the tongue was ulcerated, a small hard shotty gland on the neck was found, the patient saying " that is nothing, it has been in that condition and quite harmless for years."

In yet another case where treatment was being applied to growths on both breasts, one in the axilla and a small one under the chin, the remark was made by the patient that the latter growth was a very old one, and had been quiescent for a large number of years. It may be asked how the proof may be demonstrated of connexion in these instances between the older or primary growth and the new or secondary growth. Although absolute proof is impossible, the cases are so analogous to other cases where the secondary deposits can be traced to the primary as to make the inference almost as strong as if it were capable of absolute proof, and justify a word of warning being uttered to those who are subject to these small insig-

nificant lumps as to the contingent danger to which they are liable.

Death may supervene in a variety of ways.

Man, as a type of the higher vertebrata, has many vulnerable places. He has given "hostages to fortune" in exchange for his high stage of development. His internal organs, on the soundness of which the continuance of his life depends, soon fall a prey to the attacks of his cancerous foe. The intestines, the liver, stomach, lungs, heart, or even the brain, may succumb to its ravages, and be followed by the death of the individual.

The primary growth may remain localized, and increase in size, the increase being most rapid at the outer peripheral portion. The central older portion dying down ulceration follows with sloughing away of the parts and widening of the ulcerated area, the ulcerating portion becomes yellow, fœtid and nauseating to the smell, this matter is absorbed by the blood, slow poisoning ensues, the skin assumes the pallid hue, the yellow colour of old ivory, the patient is in the last stage, the appetite daily dwindles, complete exhaustion follows, and the cachectic condition speedily ended by death.

Stretching across the wide abyss of practically illimitable time, the procession of life by the easy and gradual stages of evolution passes upwards from the unicellular organism to the composite and highly

developed vertebrate mammal. We have seen before how between the embryonic cell and the fully developed human being changes begin to form, first by division into three layers, and from these the various parts and organs of the body are formed, the embryonic development of the individual being an abbreviated summary or epitome of the stem or phylon to which the individual belongs. It begins with the unicellular embryonic ovum, it develops from this into the multicellular organism represented by such low organisms as the Hydra, follows the worms, then the fishes with branchiæ or gills, after that the amphibians, runs up the ladder to the vertebrate kingdom and then finally reaches the goal or summit of development.

But great as are these apparent changes, they are generally morphological or physiological. The addition of a bony skeleton characteristic of the vertebrates with its vertebral column and appendages looked at broadly is simply a detail formed of projections or modifications of the body proper, the cellular build of which is stiffened by the deposition into its interstices of calcareous and other salts. Instead of each cell being concerned in the process of digestion, there is a specialization, certain cells forming a digestive sac which becomes modified into stomach and intestines. The food after being treated by secretions from these during the process of digestion is ultim-

ately carried by the blood to all the tissues of the body. In like manner, instead of what is now an impossibility, namely the reproductive process being the act of each cell constituent of the tissues, this now becomes the function of the special sexual organs in the male and female. The higher in the scale of development being the individual, the more general is this division of labour carried out in the animal economy by the adaptation of special organs to the performance of particular functions. In spite, however, of evolutionary developments, life practically and essentially is unaltered, the cell is still the prime factor and unit. It is the warp and woof, out of which all the various animal tissues are woven ; as we have seen before, the cells though modified by pressure and other agencies, are still in origin and permanence of life the nucleated protoplasmic units aggregated together to build up the individual. It is an old saying that "if you scratch a Russian, you find a Tartar," meaning metaphorically that civilization is but skin deep, a thin veneer beneath which primitive man exists ; with all his conventionalism, it is but a thin garment liable to be easily torn off, when his aboriginal temper and savagery once more appear and move him. So too with the cell of the body. As we have just seen evolutionary changes have made very little fundamental difference to it, and therefore the reversion to the rudimentary cell in type and charac-

ter in all probability will, with a comparatively slight disturbance of normal conditions, readily take place. The resumption of cell proliferation one can easily understand; we have seen how an animal of such a simple type as the hydra after being cut into pieces reproduces itself on a larger scale through this process of cell proliferation. And assuming that an abrasion, a knock or blow, disturbs the cell equilibrium in the tissues, and this cell or cells reverting to some low type, we can understand how this proliferation may begin and continue, and the product, the neoplasm (new tissue) beginning and developing on irregular lines becomes atypical and amorphous. And as civilized man reverting to barbarism leaves behind him the virtues, and carries back with him the vices pertaining to civilization, and thus reaches a lower level than that from which he originally sprang, so the cancer cells on resuming their proliferating functions which are the characteristics of all rudimentary cell life have become too degenerate to form healthy normal tissue. This function having been held in suspension whilst they remained well ordered members of the cell community of the body, and by adaptation having taken on others and so varied from the normal type, the cells on resuming their activity in multiplication are hampered by the variation, and consequently form unhealthy tissues.

This functional property of the cell to proliferate,

and in this respect its similarity to the cells of the early embryo has suggested the theory of embryonic rests, a theory suggested and as far as possible worked out by Cohnheim some thirty years ago. According to his view portions of one of the embryonic layers have been torn away, and in some part of the body to be determined by accident have settled down, and after remaining at rest for a certain period, some stimulus has reached them when cell activity has been resumed. Experiments have been made with the embryo of the chick. When the original embryonic cell has become divided and subdivided into sixteen cells, half of this number has been taken with the result that from the half a complete animal has been developed half the size of the parent. This will be at once recognized as being near akin to Dr. Beard's twin-cell theory. It made some impression when first introduced, but being unsupported by any strong argument, it has fallen out of favour. It has this against it, that cancer does not generally appear, as we have already seen, until life is somewhat advanced, and there is no explanation given to tell why the embryonic cells should cease to proliferate and then after a prolonged rest resume this arrested function. But although the theory may not be accepted, its conception is worthy of recognition, showing as it does how acutely the cancer problem has been studied, and how keenly its solution has been sought out.

Another suggested explanation of this vexed question is that the new growths are the result or expression of some fresh evolutionary development. The question is asked, has the process of evolution, which we know to have worked changes on such a large scale in both the animal and vegetable kingdom, exhausted itself ?

But from our previous consideration of the problem we must altogether repudiate this suggestion. All investigation tends to show that cancerous growths are due to degenerate action, and that involutionary processes rather than evolutionary are responsible for their appearance. Evolution is due rather to environment and the effort of the individual to adapt itself to new conditions of environment. The changes are necessarily slow and gradual ; the old proverb, " Natura non facit saltum " is especially true here. The individual being preserved by the gradual variation of existing organs, so as to perform functions on a broader scale.

In cancer we have the opposite to all this—the formation of blind tissues, destructive of all the other tissues and organs, breaking up in the end all conditions essential to the health and life of the body —the growth a pseudo-parasite killing its host.

Although the term parasite, strictly defined, can only be applied to a plant or animal living on and in another plant or animal, the former being entirely or partially dependent upon the latter for food, there

is a broader sense in which the whole animal kingdom may be looked on as parasitic, since it is entirely dependent upon the vegetable kingdom for food, either directly or indirectly.

Foodstuffs consist of the hydro-carbons, the carbohydrates and proteids: the first are built up of carbon and hydrogen, the carbohydrates of carbon, hydrogen and oxygen, the proteids of carbon, hydrogen, oxygen and nitrogen with traces of some other elements. The heat of the body is maintained by a supply of the hydrocarbons in the form of fats and by the carbohydrates in the form of starch or sugar; the waste in protoplasm is renewed by the proteids; the waste nitrogenous material is carried away by the blood, filtered out by the kidneys and discharged as urine. These organic compounds are formed by green plants only in the sunlight, carbon as carbonic acid being directly absorbed at the pores of the leaves, the two elements hydrogen and oxygen being absorbed at the roots as water, nitrogen also being taken up at the same time in the form of some soluble salt, the necessary heat being supplied by the sun's rays assimilation takes place and the above complex compounds are formed. It is this power of manufacturing and elaborating food material that makes the vegetable world the real granary or storehouse of the essential food of the world, and though flesh food is added to vegetable food, this has all been formed

from previously existing food of vegetable origin. In all chemical changes the compounds which result are divided into two classes, the endothermic and the exothermic. In the former heat is stored up, which is given up when further chemical changes take place ; thus in burning the hydrocarbons constituting the fats in a candle, heat is produced as combustion takes place, the products being carbonic acid gas and water. These are both exothermic compounds, to dissociate which, in the one case carbon from oxygen and in the other hydrogen from oxygen, would require a definite amount of heat equal to that given off by their combustion.

It is on account of this shortage of heat that the exothermic compounds are the more stable. The endothermic compounds being more unstable, since decomposition once started by the addition of a slight amount of heat, this is kept up by the liberation of a further amount as dissociation takes place.

All organic life, whether animal or vegetable, is constantly changing, all changes being chemical processes involving loss of heat. The food stuffs which are taken into the system are endothermic. Food, as we have seen, is digested and by means of the blood is distributed throughout the system, each individual cell being supplied with its needful amount of food material to supply the loss caused by cell activity, the equilibrium of the cell being maintained

as its loss of heat is compensated by a fresh supply from the endothermic food brought to it. All motion, such as the movement of the limbs brought about by muscular contraction, has a definite equivalent in heat loss which has to be compensated by addition of endothermic food material. In a healthy body, therefore, the economy or wellbeing depends on its power to keep or adjust a balance or equipoise between the daily loss caused by the general action and cell or local action, and the power of the digestive organs to assimilate enough food to make up for the deficiency thus created. It is highly probable that the origin of cancer cells, or the metamorphosis of normal cells into cancer cells, may have its origin through a local deficiency of this food supply in some local area. We can see, should this prove to be the case, why a knock or blow restricting or stopping the blood supply certain of the cells should change their character and begin to absorb their food from neighbouring cells, the change once begun continuing, even though the ordinary supply should be resumed, the cell reversion to a lower type once made becoming permanent. Assuming that cancerous tissue is formed by a degradation of individual cells to the simple typical or embryonic form, we should from this be able to explain why different forms of cancer should vary in their degrees of malignancy. We should expect those cells nearest in character and form to the em-

bryonic or elementary cell to be most liable to attack, and when they have become cancerous in nature the cancerous tissue formed from them to have this malignant characteristic, this characteristic being due to the nature of the cells attacked or metamorphosed, and not as has been sometimes assumed to the formation of some imaginary secretion termed malignin.

In the glands scattered throughout the body we find the cells forming the glandular tissues, though often modified in shape, in other respects only slightly different from typical or elementary cells, the same remark applying to the epithelial cells forming the lining of the lip, the mouth, the throat, the rectum, and those cells forming the tissues of many of the internal organs of the body as well as some parts of the tongue. If epitheliomata form on these they rapidly spread; thus, if the tongue be attacked, the large salivary glands succumb almost as a matter of course, their total destruction as a rule being a matter of very short time. This is in addition to their being fresh centres from which further cancerous growths radiate. Even if the operation on the tongue takes place at an early stage, a cure is practically impossible, so readily is the whole of this member infected. In *The British Medical Journal* for February 20 of last year, there is an article by Dr. Butlin, consulting surgeon for St. Bartholomew's Hospital, in which giving 750 as the average number of deaths from

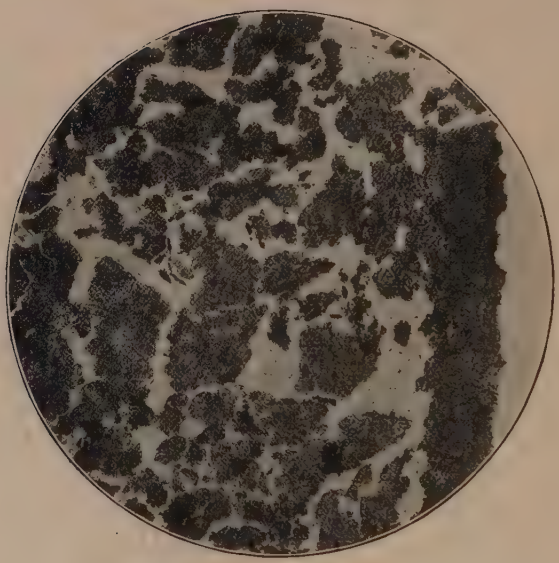

PLATE I: × 3,025

Section of oviducal gland showing it to be composed of large round celled elements. The nuclei appear as dark dots embedded in the other cell contents.

On comparing this section with those of cancer in the following plates, the similarity of glandular cells to cancer cells will be obvious. To the right of the figure is one of the ducts of the gland.

cancer of the tongue for the six years from 1901 to 1907 he says: "I suppose another fifty to seventy cases may be added to account for the persons who are treated successfully, but I am afraid that is rather a large estimate." The writer would agree with the qualification to his estimate; if we take his lower figure we get under seven per cent. of successes, a small result, yet judging from the still smaller results obtained abroad and referred to by Dr. Butlin one is inclined to doubt even the above low estimate of success. In cancer of the rectum the number of successful operations is perhaps as discouraging as in cases of the tongue. Except in the very early stage operation for removal is practically out of the question. Where coelotomy is performed, this is intended simply as a palliation, the growth being left to develop until death supervenes to give final relief to the sufferer.

Contrast the action of the growth in the above cases with that in fibrous, fatty, bone and muscular tissue, the cells of which are much farther removed by pressure and other changes, many of them of a chemical nature, from the simple typical cell. We find the so-called malignancy, the tendency to form metastases, considerably lessened, and when metastases do occur they are generally first found on neighbouring glandular tissue.

The fibroid tumours may often remain for years,

causing little pain and inconvenience; secondary deposits only come as a late development.

Perhaps the most harmless of all the atypical tissues are the fatty tumours, the cells constituting which have had most of their protoplasmic contents exchanged for fat, and are consequently most atypical in character. The bone and muscular tissues follow and occupy a position intermediate between the above and the epithelial and glandular tissues. The hard, horny, flattened epidermal cells are also little liable to attack, these generally succumbing not to the attack of cancer but to the germs which fix on the corrupt exuding serum on its becoming oxidized by contact with the air. The words " atypical " " abnormal " " neoplasm " it must be understood, when used of cells forming cancerous tissue and of cancerous tissues themselves are not scientifically correct, for if we take the embryonic cell as the typical one, being the cell from which the cells of all the tissues proceed, the epithelial connective tissue, muscular and glandular cells, are themselves atypical, having become modified and therefore differ more or less from the former in character and type.

Therefore, the cancerous cell, reverting as it does more nearly to the embryonic cell, strictly and scientifically considered may be far less atypical and abnormal than the surrounding cells from which it has differentiated.

We have in the foregoing examined the leading theories of the origin and character of cancer. The parasitic theory of the origin of cancer being due to a foreign germ, unicellular in its character, we have rejected as improbable and unlikely and practically impossible since it cannot be cultivated. The question, too, of the formation of a poisonous secretion, the "malignin" of certain writers, has been incidentally referred to and dismissed as unnecessary.

The nearly related twin-cell theory and the rest theory of Cohnheim we also find improbable and impossible of acceptance without some demonstration which at present seems unlikely to be forthcoming. Sometimes in seeking the solution of a difficulty we wander afield and at a distance in its pursuit, when it may be found close at home. After carefully considering this vexed problem of cancer, one is driven to the conclusion that this is the case with its solution. Biologically, it is sound to assume a change in the ordinary cells of the tissues; it is "one of the ills of which" our own "flesh is heir to" and not one due to an importation from without.

To the poor sufferers the words of Milton suggest themselves as they lie:

> Here, in perpetual agony and pain,
> With terrors and with clamours compassed round
> Of mine own brood that on my bowels feed.

Whatever we call the dread disease—tumour, cancer,

carcinoma or sarcoma—or use the simple English term growth, benignant or malign, its origin according to the theory we have adopted is due to some subtle but definite change in one or more minute cells in some particular tissue of the body. Small and almost painless at the beginning, its effects localized in a narrow area, it begins its insidious apparently harmless existence.

So treacherous is it that often where its victims have sought advice in its early stages, and been told its serious character, the opinion has been received with incredulous laughter, so incongruous has it seemed that such a small insignificant lump should be fraught with such serious and fatal consequences.

But however small its beginning may be, in malignant cases especially, its increase is continuous at a constantly accelerating rate of growth; from being painless pains most excruciating shoot through the parts affected, these slough away, and in some severe cases one wonders how the human body can for so long survive the attacks of its merciless foe, after becoming "a loathsome thing, all pestilence." The small, apparently harmless lump has ended by becoming a ferocious, gnawing, abhorrent creature, the victim as helpless and hopeless in its toils as Lalla Rookh when her repulsive spouse tearing away the veil says—

> Here, judge if hell, with all its powers to damn
> Can add one curse to the foul thing I am.

CHAPTER III

"Strangle it, else it sure will strangle thee."

FOLLOWING the discussion of "What is Cancer?" comes the further inquiry, "Is it possible to eliminate this pest from the body and to utterly destroy it?" Just as of old the Jewish prophet cried out "Is there no balm in Gilead?" so to-day the cry is raised, Has cancer the power to set at naught every effort made by men of science to destroy it?

In 1907 the accredited organ of the British Medical Association, *The British Medical Journal*, made the following sorrowful admission which does not since seem to have been modified, viz.: "We shall be glad to be convinced that a cure for cancer has been found; we will welcome it frankly and joyfully whether it comes from Edinburgh or Timbuctoo, but we are sorrowfully bound to say that as yet we see no signs of a deliverer from the foul scourge." In considering this question one is tempted to ask whether the right way has been adopted in seeking out first the cause, of cancer and concentrating all the exhaustive processes of research to this purpose. Find the cause,

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say a good many, and the remedy will follow as a matter of course. Adopt this method and apply it to other evils and we see how irrational it is.

Take, for instance, the case of some extensive conflagration. Have all attempts to put this out to be held in abeyance until some academic discussion has determined the nature and character of flame, and as a preliminary experiment must some cheap wooden huts be set on fire to assist in coming to a right conclusion on the subject? To practical men the first consideration is to stop the spread of the disaster by quenching the fire, or at any rate by preventing it from spreading to the surrounding buildings. The question of the origin of the fire, though important enough, is decidedly secondary to this, and must wait until the former has been accomplished. If the cause of cancer were settled to the satisfaction of everybody concerned to-morrow, it is questionable whether the relationship between cause and cure could be established then, or whether this relationship would have any existence at all or not. To an outsider, one holding a detached position, it would seem as if the medical faculty were too much afraid of empiricism, and yet looking back on the history of their profession how much it is indebted to the empiric for progress made in many directions in the healing art.

The accidental discovery of the medicinal proper-

ties of Peruvian bark due to the quinine which is now extracted from it is a case in point. The effects of chloroform, to which the world owes so much for relief of pain in operable cases, were both unpremeditated and unexpected. The discovery of the effects of radium, from which so much help is expected for the surgeon, was partly due to a lucky accident. Instances in other branches of science could be easily adduced, where such fortunate accidents, aided by a happy intuition followed up by scientific reasoning and experiment, have led to important discoveries in many fields of knowledge.

There is still a wide domain for the imagination. By its aid many of the theories of science, supported now by facts and experiments, have been originally formulated, and have inspired the workers who have finally demonstrated their truth. Working on inductive principles is generally the safest method, but very often there are cases which can only be solved by a combination of the inductive with the deductive. One is lead into this line of thought by what is frequently heard respecting those who are busy following out researches in studying the growth of cancer. In weighing the value of any contribution from an outside source, it is not weighed or measured on its merits, as a rule, but is determined by the quarter whence the contribution has come. How is it possible, they ask, for men who have

sought out for years a solution of the cancer problem, who have been scientifically trained for research work, who have everything in accessories, the best of assistants at their call, yet fail to reach their goal, and an outsider come in where they have so signally failed, and meet with success? Medical men have reasoned in this manner, and in some cases where patients having been given up as utterly hopeless by their medical attendants after repeated use of the knife and are now quite free from their merciless foe. These have adjudicated on such cases and without leaving their armchair have pronounced such a thing an absurd impossibility. Such men would do well to ponder the words of the wise man who saw that "the race is not to the swift, nor the battle to the strong, nor yet favour to men of skill." Pertinent to these remarks are those of Dr. Forbes Ross, who is reported to have said, "that every discovery or advance which has been made in science, whether it be electrical, mechanical, medical or chemical, has been due to the work of an independent, uncontrolled man. Not one in the world can be ascribed to any committee, and cancer is not going to prove the exception."

The medical profession is a noble one, it has its roll of martyrs, whose names would dignify and add lustre to any association; its code of rules regulating its strict and exclusive etiquette make it one of the

closest corporations in the country, and give it a prestige and standing obtained by no other of the professions. Like all strictly organized systems it has the defects as well as the merits characteristic of its system, the weakness concomitant with its strength. Like the spiritual hierarchy of old, the tendency is to form a hierarchy for the body; there are the special few whose "ex cathedra" utterances bind the common practitioners. Speaking of a radical reform in a surgical operation which was suggested, one man with a large provincial practice said: "I should certainly adopt no new method unless it had the written approval of a leading English surgeon." The effect of this is bound to be seen in the more limited resourcefulness of the average practitioner who, lacking originality, will show less eagerness in observing and in noting fresh features in cases of disease and malformation. Such a remark as the above at once stamps the one who uses it as second-rate, doomed to follow in a groove made out for him by others and limits him as a pioneer in the discovery of new truth in his own special domain.

As one reads the yearly reports of institutions set apart for the treatment and study of cancer, time after time one is painfully struck with their "will o' the wisp" character; each report is practically the stereotyped one that there has been no practical advance made since the last report, but each one is

hoping to be on the eve of some important development which will be fully realized by the time the next report is issued.

In reading these reports the elusive character of the chase is most striking, and knowing how intensely and acutely the work has been carried out and the importance of obtaining success we can sympathetically share in the worker's feeling of disappointment at the repeated failures.

In enumerating the attempts which have been made to destroy cancer it is doubtful whether the experiments made on rats and mice should be included. Though the destruction of the growth is the ultimate effect intended, the more immediate intention is to obtain information on the genesis and character of cancer. The holocaust of these helpless animals has been on a stupendous scale; experimenters on them deal in tens of thousands in describing their work, one room alone being said to contain as many as ten thousand mice which were suffering from artificially induced cancer. The yearly number of cases where mice were made subject to cancer reported in one year under the Vivisection Acts was forty to fifty thousand. It must be work of a most objectionable and nauseating character, and only a strong resolution to gain the desired end in spite of any obstacles can have enabled men to overcome their natural feelings of repugnance in carrying it out.

One fact is worth considering in connexion with artificially induced cancer which is bound to reduce the value of experiments carried on in this direction, and that is that very little information can be obtained from them as to the origin of cancer in the human body. The transplanting of cancer is somewhat difficult ; it is impossible if the cancer cells alone are transplanted, these soon dying away. Surrounding cells must be taken with the cancer cells if success in keeping the growth alive is to be obtained. When cancer can be induced in the lower mammalia under conditions which are supposed to be identical with those which lead to the origin of cancer in man, then workers in this direction may obtain information of more value than any hitherto obtainable. Efforts to do this have been, however, so far unsuccessful.

In considering the results accomplished and trying to come to a fair appreciation of their true value, one is forced to the conclusion that these are far from commensurate with the energy and time employed, leaving out of account the infinity of pain inflicted upon such a number of animals.

In discussing the methods used for treating cancer priority must be given to the knife, since if it be the clumsiest and crudest method it is perhaps the oldest, and even to-day is the most widely adopted. Its use before the discovery of anæsthetics must have been a most painful one, especially in growths widely

spread. In describing the use of the knife a book on surgery written in the seventeenth century gives the following instructions :—

"It must be cut away by the roots thus. The part affected being held by a pair of forceps, is to be cut off by the help of a fit knife, close by the very roots, so that nothing be left behind, lest it should bud afresh. Some hold it only with their left hand, others pass a string through it twice crosswise and holding by the ends take it off by Incision. The Incision being done, the thicker Blood is to be squeezed forth everywhere, and then the place to be seared and burnt with an Actual Cautery, that thereby the Reliques (if any be) may be consumed, and then the affect is to be healed as a common wound or Ulcer. Yet some stop the flux of Blood without the actual Cautery by drying Powders."

Surely the patient who in preanæsthetic days could bear a drastic operation of this character would be worthy to rank in bravery with the Spartan youth who patiently bore the gnawing of his entrails by the fox.

Practically the use of the knife is the same to-day as when the above description was written. The cut is made more extensive, the tissues are more widely removed around the ramifications of the growth, and perhaps best of all the discovery of anæsthetics enables the surgeon to carry out the operation pain-

lessly. In estimating the value of the knife one finds a difficulty. The estimate of success is greatly varied even by those who firmly advocate the use of it. One operator in connexion with one of our largest provincial infirmaries estimates that forty per cent. of those cases which are operated upon in the early stage are successful. This is an estimate merely, and the qualification "early stage" is so elastic that the forty per cent. may be reduced, and no doubt is, to a mere fraction when taken upon the total number of cases in which the knife is used. The risks attending the use of the knife are great; at the best it is a crude and blunt instrument. Could it be endowed with the powers of the microscope its efficiency might be increased. This is however a paradoxical suggestion, since these powers would demonstrate its unfitness for the work. We have seen previously how cutting the hydra acts as a stimulus to cell proliferation. Each piece cut from the hydra is probably equalled or excelled by that of malignant growths in proliferating capacity; if by any possibility they can be totally eradicated the operation may be a success, but these instances are rare, and one can only assume that they have not become malignant. Should the operation fail, as it does except in a slight percentage of cases, as we have seen, then the operation aggravates and magnifies the evil. This is not a speculative opinion

of the writer, but is the outcome of close personal observation of a large number of cases where the knife has been employed during the last one to two years. The diagram is taken as a typical case and not as an exceptional one. Here the seam, some 12

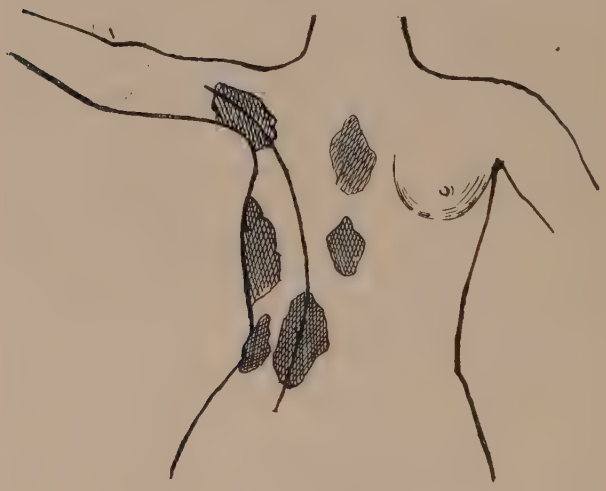


FIG 13.—Recrudescence of growth after operation with the knife. The curved line is the seam. The shaded patches are recurrent growths, forming foci from which further development proceeds.

inches in length, began in the arm near the shoulder joint, the right mamma was removed; descending still further a curve was made towards the right side. The case was brought to the attention of the writer a few months after the operation, when the following

growths were noticed: One about the size of a small orange at the beginning of the cut on the arm; a large one eight to nine inches in area in the angle of the curve at the other end of the cut; a growth somewhat larger opposite to the last and divided from it by the seam, and a fourth firmly fixed to and involving one or more ribs, evidently overlooked at the time of the operation, or which had been avoided as too dangerous to be interfered with by the knife. The total growth, largely in excess of the original lump, which was comparatively small, forms now four independent centres for fresh growth from which metastases will spring if not killed in time to prevent this.

The time is yet, perhaps, distant when the knife will be altogether discarded, so conservative is the medical profession in leaving old grooves. To those who are wedded to this process it is perhaps worth while suggesting that even when using this method some adjunct might be of great service. The recrudescence, for instance, so often follows the cut or seam that one is compelled to use the much used expression that "the growth follows the knife." Sometimes too the holes formed by the needle in stitching are filled up with hard dense growth; whether the reason is that the knife has become loaded with cancerous cells in cutting into the growth through the dermis, or whatever is the cause ought at any rate to be

ascertained, and if it cannot be avoided means ought to be adopted of killing or sterilizing these cells.

It may be too that whatever other system is generally adopted, growths of 7 lbs and upwards in weight can only be cleared with the use of the knife. In any event, where the knife is used this tendency to recrudescence along the track of the knife will have to be dealt with. One writer in *The British Medical Journal* for February of last year cites one surgeon who claims great success from the use of X-rays along the seam after operation, so that if this method were used, or some other method to be mentioned later, a higher percentage of successes from this unscientific, rough-and-ready method might be obtained.

The work of the operating surgeon must be a despondent one when engaged on this toil, which is worse than that of Sisyphus. The latter had only to lift again the same weight, but generally the surgeon when he has to renew his labour finds his task more than quadrupled. One is reminded of the parable of the unclean spirit which, being cast out, returned to find the house empty, swept and garnished and then took with him seven other spirits more wicked than himself and entered in and dwelt there, and the last state of that man was worse than the first.

If then we strike a balance between the benefits

and the evil wrought by the knife, including in the former the small number of successes due to this means, and on the other hand taking into account the stimulus it gives to increase the rapidity of growth, and thus its tendency to shorten life, one is driven to the conclusion that the use of the knife is on the whole disadvantageous.

Amongst other methods for the destruction of cancer is the medicinal one. Like the knife this is antiquated. From what we know of the nature, character and origin of morbid growths it is difficult to see how they can be expected to disappear by this roundabout and necessarily feeble attack upon them. Taken with the food all medicines have to pass through the alimentary tract, beginning at the mouth, passing through the stomach, thence into the intestines, they finally reach the blood, after being subject to the action of all the digestive secretions. If not acted upon chemically by any of these they are so diluted when they reach the seat of the evil as to be practically neutral. Were it otherwise, they would not only act upon the growth, but being spread throughout the system anything strong enough to have this effect would lead to such a disturbing constitutional derangement that it would destroy the life of the patient, for as we shall see later to destroy the cancerous organism thoroughly, all the cells composing it must be disintegrated and

destroyed, and anything in the way of medicine or food capable of such a drastic effect in some local situation would destroy the normal cells of the body generally. When such exorbitant claims are made upon our credibility as to the wonderful effects produced upon cancerous growths by special food stuffs, or the drinking of water in which clover tops or violet leaves have been boiled, it is as well to take these with the proverbial grain of salt. Some of these things may help to keep up the condition of the body and prevent it from succumbing quite as early to the attack, but the sooner the delusive idea is shattered that the growth itself can be killed by them, the less the misery and disappointment afterwards entailed.

Were the complaint a constitutional one, as some assert, and each part of the body equally affected, one could understand more readily these claims, but as we have seen the origin is purely a local one, and to deal with it effectively a local remedy must be applied. Whatever preventive effects, then, an anti-cancer-toxin may have, if ever such be discovered, or whatever effects a stipulated food diet may have, these will have to operate before cells are turned malignant. When this change has once taken place, these remedies will be valueless as a means of destroying the new morbid tissue.

The following agents used for the treatment of

cancerous growths may be treated together, viz., the X-Rays, High Frequency Currents, Finsen Light, and Radium. Concerning all these, high hopes and expectations have been raised that something tangible had at last been found which would at length deliver the world from its terror of the remorseless cancerous enemy.

It is not a pleasant task to criticise hostilely the failure of effort to treat something like cancer. One would naturally wish to see success achieved, yet criticism to be of any value must be true. Leaving out radium for the moment, it is only stating openly what is felt generally, that practical results are not at all commensurate with the early hopes and expectations formed in connexion with these agencies; in some cases relief may have been given; the evil day may possibly have been somewhat postponed, but these results generally have been of very little practical value. It is sometimes difficult to tell in cases where slight relief is for a short time produced whether the effect is really objective or subjective. Sometimes a doomed cancerous patient is like the proverbial drowning man ready to clutch at a straw, and whatever the remedy suggested it gives a ray of hope in his despondency. This for a time gives him a buoyancy; the very fact that he is making some attempt at recovery has a cheering influence and so makes him feel better temporarily. If there

is any permanent alleviation this of course continues, but if not, the patient sinks back to the old condition, so that often improvement which is short lived, and which is due entirely to the patient's hopefulness is credited to the treatment which has created this temporary improvement, the benefit being a merely indirect one. It is questionable then whether any very great results have been obtainable through these agents. In some cases of ulcerated growths there is no doubt that instead of causing the ulcerated part to granulate and fill up they have caused it to increase in area and become more aggravated.

With regard to radium it is too soon to speak. Sir Frederick Treves, in his lecture at the Royal Hospital, pointing out the good done by the X-Rays and the high frequency currents, shows their limitations, and then proceeds to speak of the work done and the results expected from radium. In treating of the former, he mentions what was shown to him by Dr. Louis Wickham of the Institute of Paris. Leaving out what he mentions that does not pertain to the subject we are discussing, he instances rodent ulcer as successfully treated, epithelioma of the tongue and epithelioma of the lip, these are all in the early stage. He mentions that others claim by this means to have cured much more advanced cases. In reference to these and other cases Sir F. Treves says: "You may ask, 'but are these results

permanent?' They apparently are. It is true that no great amount of time has yet elapsed! but I saw one case in Paris where an epithelioma of the face cured by radium was perfectly sound at the end of two years. We await with interest the extension of this measure of treatment to malignant disease of the uterus and rectum." But in spite of the most encouraging words embodied in his lecture, Sir Frederick concludes in the following ominous sentence. "Finally let me once more warn you against raising false hopes in discussing the potentialities of a little known remedy."

All will unite in heartily wishing success to the new home which has been founded as the outcome of this lecture; the more sides on which the citadel can be attacked the greater the measure of success to be accomplished. In spite of the claims made on behalf of radium it can only be considered as being in the experimental stage, and the small number of successful cases so far obtained or claimed for it, gives one a certain reserve in building very much upon it, until this number is largely extended. One great drawback to the general use of radium is its great scarcity and the difficulty of isolating it, and the consequent high price which will prevent its general use for a very long time. Its effects are due to the X-rays which emanate from it. As we have seen, these have not had a great amount of success in cancer

treatment. Will those proceeding from radium be of so much greater intensity as to secure greater success in its application ? An answer to this question can only be given after the lapse of some considerable time. Another treatment for cancer recommended is that of trypsin and amylopsin. We have seen already Dr. Beard's theory of the origin of cancer, that like the embryo in the shark which is an attempt to form an asexual form similar to that in other lower animals, "an alternation of generation" as it is technically called, so the formation of cancer in man and the lower vertebrates is an attempt at a similar formation. Beard found that concurrently with or immediately after the formation of this trophoblast in the embryo shark, the pancreas made its appearance and by the pancreatic ferments which it secreted the new tissue was dissolved and destroyed.

Reasoning from this in regard to cancer he came to the conclusion that through the failure of the pancreas to perform its function of secreting pancreatic juice the formation occurred and was not destroyed. He therefore suggested supplying artificially by injection into the blood the lacking ferment—trypsin—and added to it amylopsin, the one to destroy, the other to absorb the dead matter of the cancerous constituents. The theory is a beautiful one. It was taken up and advocated by Dr.

Saleeby in a book written by him entitled *The Conquest of Cancer*. He, describing the theory and the treatment, claims that in some cases complete cures have been obtained, that patients who have been exhausted by cachexia, the fatal stage in cancerous patients, have been considerably relieved, that in cases where the cancer has become rodent, and the surface covered with the nauseating ulcerous fœtor, this has become clean and free. Yet in spite of these claims the treatment seems to have been quietly dropped and discontinued. One great difficulty was early foreseen: the amylopsin to be effective had to be administered in daily increasing doses. As the body accommodated itself to the ferment the effects were reduced, and to obtain the same effect larger doses had to be given, as in the use of morphia. This increased quantity proved poisonous, and the treatment, if continued, proved fatal. The question has suggested itself to the writer whether the application of the treatment has been on right lines and whether if the preparations will destroy cancer, it is a rational proceeding to inoculate the body at the thigh or some other position away from the growth, and thus having diluted the ferments with all the blood in the body expect it to be strong enough to destroy a malignant growth in the breast or axilla, many attempts of which the writer has met with which have ended fatally.

If as Dr. Saleeby claims, it not only destroys the particular cells forming cancer but the " malignin " which some claim to have discovered—a poisonous serum surrounding the growth—why not use it in full strength at the seat of the evil, and inject it into the cancer itself, and thus gain the full effect of the action of the ferment locally and avoid those evils of a constitutional character which have proved so disastrous. The cancerous foe is fortified on such a scale, that it is a pity for any piece of artillery to be out of action, every gun ought to be at its highest point of efficiency and in the best position for accomplishing its destruction.

There is no doubt that the method of drawing cancers from their position by plasters of a certain kind has met with some measure of success. Fifty years ago in the neighbourhood of the writer's residence, according to common repute several of these successes were obtained. And to-day a similar method is being adopted with some satisfactory results, but what the percentage is or whether these are on a large scale there is nothing available to show. The method is certainly a most painful one —and in some cases a dangerous one as well.

The question to be considered in the destruction of cancer is " What are the best theoretical means of destroying it ? " and then see if a practical application of this theory is possible. We have seen in Chapter

II that the cancer growth is not an indefinite mass, but that it is built up of individual cells uniting together to form cancerous tissue, these cells resembling though differing to some extent from the cells of the tissue in which they arise, especially in the proliferating capacity. There is another point regarding the apparently normal cells round about the cancerous cells; these too by the influence of the cancer cells or the serum which comes from them and which perhaps may be considered as the "malignin" already referred to, may be metamorphosing into cancer cells.

At any rate cancer cells of themselves cannot be transplanted and live, but if these surrounding cells, "scaffolding cells" as they have been called, be transplanted with the cancer cells, the latter continue to live. So that there are the cancer cells to destroy and also these "scaffolding cells" as well. We have seen previously how cell growth takes place in simple cell organisms such as torula and amœba or in cells forming complex growths consisting of multiple-celled tissues, and that is by simple cell division where the nucleus and cell contents simply divide by fissure, each cell forming two new cells. Also by karyokinesis, when more complicated changes take place in the nucleus and the single cell resolves itself into a number of new cells. In either of these two cases the nucleus seems to be the part

of the cell where this proliferating activity first commences, and consequently is the first important point to be considered in connexion with the attempt to stop the proliferation.

Growth or cell multiplication proceeds under favourable conditions without limit, the principal of these is sufficiency of food material. Any amount of torula, ordinary yeast, can be produced with sufficient food in solution, though it is said that the presence of oxygen in excess will check this proliferation.

There are certain chemical reagents (see Fig. 6) which have long been known to act upon and destroy the cells of tissues or individual cells; some of these act upon the cell as a whole, others are known to have a strong effect on the nucleus, shrivelling it up and destroying it as a factor in cell multiplication.

These are biological effects which should afford a clue to the successful treatment of cancer, and should assist in giving an answer to the question with which we began as to the best method of destroying it. In actual warfare no direct attempt is made to destroy the enemy as a whole, this is done by the destruction of each individual unit. So with cancer; individual cell proliferation must be first stopped, and disintegration of each cell must be accomplished as a means leading to the destruction of the whole cancerous tissues, and if possible some effect should also

be produced on the surrounding so-called "scaffolding cells." As the growth in its origin is local, the greatest effect should be brought to bear locally. If local abscesses can be induced by means of which the corrupt disintegrated cell material can be carried away without adding extra work to the excretory organs, so much the better. One way to stop cell proliferation is to stop the supplies, and the inflammatory process leading up to the formation of these abscesses would by constriction do this, by restricting the flow of blood, for it must not be overlooked that although the cancerous growths become parasitic the blood vessels enter into them and supply them with nutriment. We have noticed how oxygen keeps torula from multiplying; as cancer cells are nearly allied to torula we shall be safe in assuming that oxygen will have the same effect in both cases. If, then, we can obtain a simple chemical solution, or build up a solution from several, which would accomplish this result, we should practically be proceeding on lines which, theoretically and scientifically, would be sound especially would this be the case if the solution had a selective affinity for the cancer cells in the way of their destruction in preference to the normal cells of the tissues. In an analogous way to the reactions of some inorganic substances, as for example when a strong acid is added to the metals zinc and iron, so long as there is any of the

former metal to attack, the iron is practically unaffected, but when the zinc is dissolved then any remaining acid will attack the iron.

The cancer cells, it will have been understood, are in spite of their capacity for proliferation—or perhaps because of this—degenerate cells, and therefore more easily destroyed by such a solution as referred to above.

We have seen (page 61) how the attack on cancerous growths by means of food or medicines taken through the alimentary tract, would necessarily fail by reason of their extreme dilution when they reached the growth, or if made strong enough would be prohibitive because of their derangement of the general system.

But although the firm, compact cancerous tissue could only be disintegrated by direct injection into it of some strong solution specially adapted to this purpose, there is a strong possibility of using some specially prepared internal toxic compound which will give immunity to normal tissue cells against loose floating cells which, wandering away from the primary growth, induce the metastases or secondary deposits.

The change effected in the ordinary cells by the influence on them of malignant cells, we can only imagine as some subtle indefinable stimulus acting through the protoplasm of the cell, especially on that

contained in the nucleus. So that, although the solution required for the destruction of growth already formed must necessarily be strong to accomplish this, the agent required to make the cells of ordinary tissues proof against the influence of wandering cells from abnormal growths may be sufficient to effect this, even in so dilute a form as to leave the former uninjured. Theoretically, then, the most effective attack on cancer would be a combination of both an external or local one and a general or constitutional one, the former to directly kill it and the latter to make its further spreading impossible by making the body cancer-proof.

It is extremely likely that the constitutional remedy would act in two ways : (1) in the one just suggested, by killing off the floating detached cancer cells which are the great difficulty in the complete eradication of the pest ; and (2) by some influence, chemical or physical, on the ordinary cells, giving them increased power to resist the proliferating effect of the former.

This opens out a wide question, and that is with regard to the prevention altogether of the formation of cancer. The difficulty in obtaining any information in this direction so long as the knife has been the only agent used for its removal has been simply overwhelming, there being no starting-point from which to begin building ; all the evidences as to results

would be of a negative value and their proofs would be so uncertain.

But if in connection with the removal of cancer some subsidiary help should be discovered which would act in the way suggested in the prevention of the spread of growth, the positive proofs of this would be available and so evident as to become convincing.

When found, in all probability this agent will be a cumulative one, and only a small quantity would need to be taken at considerable intervals of time, so that not much inconvenience would be experienced in taking it into the body.

What a boon a discovery like this will prove to humanity—of something which will prevent the origin of cancer. Granted that a solution can be discovered which will destroy the growth, the next step, that of preventing the mischievous secondary effects, should be a much easier one, and once this having been obtained, it would naturally follow that it would prevent the formation of cancer altogether.

We know how the carrying out of the muzzling orders stamped out rabies from the canine race; let us hope that it does not pass "the wit of man" to devise means for effectually ridding the human race of its more dreaded cancerous foe.

Eighteen years ago the question of some method of successfully treating cancer was forced upon the

writer. A member of his family being attacked by the disease a consultation, first with his own medical adviser and then with an expert on this special form of attack upon human life, took place. Being quite ignorant of the subject, the surgeon's advice to use the knife and thus "get clean rid of it" was implicitly followed, and the operation carried out at once. It was a great disappointment in answer to the question as to whether the growth had been all removed to be answered in the negative, and a strange commentary on the advice given above to be told that a relative of the surgeon's had been operated upon thirteen times and then succumbed. On the further question being put to him if it would come again, the surgeon replied that it would, but that it might be six months before. As a matter of fact the growth was again felt in about three places in less than two months after the operation. The growth, it should be said, was in the axilla. It was a most disappointing result and in this case, at least, condemned the knife as a hopeless agency for the removal of the growth, and made one feel that its further use would be simple butchery.

With some knowledge of practical and theoretical chemistry, physiology and biology, the writer was impelled to make some endeavour to save the—to him—valuable life which was threatened, and prepared from the time of the operation for the recur-

rence of the growth. At the time the theory just laid down was only dimly formulated, but, roughly and generally speaking, it was the one followed. A solution was prepared, the growth was attacked in the early soft stage, and though the arrest of the growth was uncertain for weeks, it gradually became a matter of certainty, and ultimately its disappearance was made certain. No secret was made of the discovery, but, strange to say, whoever was told the news received it with scepticism; even one of the medical men who was present at the operation and who knew that this had not been successful in removing all the growth, received the statement with an incredulous smile, though he had helped the others to give the impression that the case was a hopeless one.

The treatment lay dormant for over sixteen years, until the middle of 1907, when it was tried on three practically hopeless cases, in one of them after operation had become impossible, the other two were cases of recrudescence after operation. In all three cases great improvement followed, but unfortunately in two of them the treatment was given up too soon, the growth re-asserted itself and they were lost. The survivor is alive and well. In his case he had been operated upon for cancer of the lower lip, the operation being carried both ways so as to expose the glands on each side of the neck. The recurring

growth filled up the depression formed by the curve of the lip and projection of the chin, and gave a rounded aspect to this part of the lip. The top of the lip had begun to ulcerate and for some time after all the growth had disappeared this ulceration remained, but it is now cleared, leaving no trace of either ulcer or cancer.

Thus of the first four cases on which the treatment was tried, three out of which were cases of recrudescence and the fourth given up by one of the best surgeons in the North of England, two cases have been as far as can be seen completely healed, one of the two which ended fatally had his life prolonged from a problematic fortnight to some nine months, whilst the fourth had his life prolonged for a like period, and if the treatment in both these cases could have been applied regularly as prescribed there was some hope of ultimate success.

These successes with this hitherto considered hopeless disease getting known led to a large number of other cases coming for treatment. They came in every stage, but were mostly those of a very advanced character, including many in the last stage of cachexia. Some were badly ulcerated, the breast in one or two cases being completely eaten away. At the beginning all internal cases were declined. Afterwards, in response to the most urgent appeals of the sufferers, cases of the rectum and uterus were treated.

In some cases those came where the use of the knife had been repeated many times ; some of them are now completely freed. The greatest difficulty has been with the metastases or secondary deposits. These are the despair of any method. External and in the earliest stage there has been no difficulty ; this difficulty has occurred when they have become internal and deposited in the lungs or some other internal organ of the body where the treatment could not be applied. Although the largest proportion of the cases are those given up as hopeless by the medical men, there has been a fair number of earlier growths. What a relief to have them in this early stage, and with what comparative ease they disappear ; there are no secondary deposits to fight, it is a singlehanded combat.

Whatever may be predicted as the future treatment for cancer, whether this or some other, it means some risk in carrying it out. Human life is such a sacred thing to experiment upon. In beginning the writer felt this, and any one will easily appreciate the mental worry in trying this treatment. One could not help this question protruding itself : " Suppose the first successes were merely accidental ? " Some say that there have been cases where cancer has spontaneously disappeared ; what then would be the result if these first should be cases of a similar kind ?

Repeated successes, however, set these doubts and worries at rest, and proved beyond question the efficacy of the treatment ; experience also suggested further changes in the solution. These have had to be made with care as the chemical combination of some of the constituents is a very unstable one. Caution has had to be exercised also in removing a local disturbance, lest something should be introduced to disturb the general system.

There is a well-recognized difficulty in diagnosing cancer and allied growths. Sometimes, for instance, swellings are mistaken for these growths which are ordinary simple abscesses or simple inflammatory processes which may be made to pass away by the ordinary simple method of fomentation. Generally those with a fair amount of experience can recognize the difference, but in some cases these can be deceived, especially when the trouble arises in the breast. As an illustration a woman who had been examined by her own medical man, and who had then been referred by him to the infirmary, was again examined there with the result that she was instructed to come in for operation at a later date, yet before the time had elapsed the swelling entirely disappeared.

It may be remarked in passing that great as is the difficulty in diagnosis of cancer, this difficulty is a vanishing quantity in comparison with its prognosis.

In other maladies the latter is a comparatively simple matter, each having its period of increase, its critical stage, following which it declines and passes away. But in the case of cancer its course is erratic, no general rule as to its progress can be formulated, nearly every case has a life history of its own, differing in a good many respects from that of all others.

Fortunately the treatment itself is a valuable adjunct in overcoming the difficulty of diagnosis; by constant use of the needle one easily learns to discriminate between cancerous and normal tissue in puncturing these to make an injection.

The extent of the growth is often a matter of doubt. The hard lump consisting of old hardened cells can easily be defined by holding it between the finger and thumb; the newer cells, the softer part of the cancer, are more elusive—there the effect of the solution is of great service.

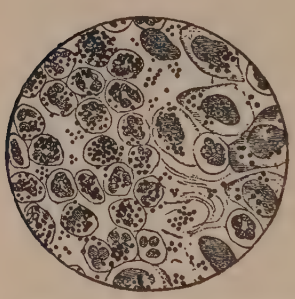
In its earliest application its selective affinity for cancer cells is most marked. Its effect on these is to make them swell and harden, giving the cancerous tissue a much greater prominence to the touch, and defining it clearly from the normal healthy tissue surrounding it, this hardness being communicated to the softer cells as well as to the hard ones. Whereas if felt by the fingers alone the growth would appear to gradually shelve away into the normal tissue without any sharp definite line of demarcation, thus

leaving no doubt of this discriminating action of the solution on the two kinds of cells. Further in the very early stage of cancer, when all the cells are in a soft condition, it is difficult to determine whether cancer exists at all or not. In several cases where this doubt has existed, the hardening effect of the solution upon the growth has effectually dispelled the doubt.

Formerly it was considered sufficient in operations with the knife to cut out the growth apparent to the eye and touch; later every surgeon not only advises that this should be done, but also that the cut should be made more sweeping and include apparently sound tissue on all sides of the growth itself to secure immunity from a second attack; "leave nature," they say, "to effect the restoration of the parts removed." The use of the treatment confirms this advice, and by demonstrating how widely the apparently small growth may have infected the surrounding parts, shows why the older more limited method of operation was bound to end in failure.

By the treatment some light is thrown on to the relationship of the scaffolding cells with those of a more pronounced cancerous nature; the latter as a matter of course die down, losing their active properties and becoming indurated or softening into ulcerated sores, the life history of cancer cells being therefore a comparatively short one. The active

continuance of cancer depends on new cells being recruited from the normal surrounding cells, the above-named scaffolding cells, which may therefore be considered as malignant cells in the initiatory stage, and we thus clearly see why their removal along with the cancer cells is necessary in the transplanting of cancer from one position to another in the same body, or from one individual to another.



FIGS. 14 and 15.—Staphylococci (magnified 950 times) (after Sternberg). Streptococci (magnified 1000 times) (after Sternberg).

It at the same time strongly confirms the view already expressed of the necessity in operations of including a wide sphere for the work of the knife, or perhaps it would be better to say that it suggests that so wide an area may be affected from the central growth as to make the knife—except in very few cases—entirely useless.

When cancer has advanced to the ulcerated stage

and the discharging pus has assumed the yellow colour and gives off the repulsive stench, this result has been accomplished by the admission to it of streptococci — the erysipelas microbes, and other foreign germs, the combined action of which is most destructive to the tissues, and the toxic effect of which is so disastrous to the system as a whole. These disastrous complications have been very baffling in dealing with cancer at this point of its development, an antitoxin suitable for the destruction of one microbe utterly failing when more than one have been present together. But even here the treatment has had a fair amount of success, the needle killing the growth under the surface, whilst the use of the asbestos pad by soaking it in the solution and then spreading it out in the wet state over the open sore has cleaned off the grey matter, the pit or depression has filled up and a healthy granulated surface has formed, and the corroding extending action of the ulcer on the circumscribing boundary of healthy tissue has been checked.

When complete success has not been obtained the gnawing action of the ulcer has been considerably retarded and the pain from this action almost completely relieved.

It is hoped by the use of a solution which is intended to supplement the one now adopted, and which gives promise of being very effective, to obtain

an increased measure of success in dealing with these extremely unpleasant and painful cases.

In many respects it has been a matter of having to feel one's way. Cases of ulcer such as those referred to are looked upon as denoting the final and most serious stage in the life history of cancer, and a running open sore something to be avoided.

Therefore when, in the early experience, inflammation with a large collection of pus ending in small abscesses took place, some anxiety was felt lest this should mean incipient ulceration, and suggested caution in inducing it. Wider experience, however, shows that this inflammation really results from the irritation of the dead disintegrated cancerous cells and is an indication that the treatment is acting efficiently and is undoubtedly a help in itself to kill off cells in the remaining growth. Where it has been very acute it has sometimes cleared away the growth altogether. This method of clearing cancerous tissue has puzzled some medical men who have examined the cases. One of these saw a patient whose right breast had been amputated before treatment, and where the growth had reappeared near the right axilla; several square inches of cancer had been removed by the treatment, and marks where the induced abscesses had discharged were still apparent. After examination of the place and taking time to mature his opinion, he wrote to the patient, saying that it

PLATE II × 10,000

Discharging pus from disintegrating sarcoma. The nuclei and cell contents are shrivelling up under the effect of the treatment.

was his belief that the small lumps under the arm were caused by small abscesses. This was the truth, but only a partial truth; it however prevented him from realizing the remaining more important fact, that cancerous growth had pre-existed there, sufficiently serious to lead the family medical attendant to warn the husband that the life of the patient would be a very short one.

Some instructive observations on debated questions in connexion with morbid growths will be of general interest in connexion with this treatment, especially as to whether these growths are local or constitutional. It is only claimed on behalf of the treatment that its action is local, each separate growth has to be treated *in situ*. As is usually the case in connexion with old growths, metastases or fresh lumps have developed in other places when the treatment has been applied at some local spot. Where these have appeared, however, has generally been on some near gland or glands, the rule being that these metastases appear quite near to the primary growth, in all probability cells having become detached from the latter and deposited in their new site before the treatment has commenced. These new growths, if attacked on their earliest appearance, soon disappear. If the complaint were constitutional and the remedy a purely local one there would be a continual recurrence of these metastases; as a matter

of fact, however, this does not prove to be the case, it is only when these unfortunately appear on some internal organ that they get beyond control. As an illustration take the case of Mrs. B., who had been operated upon seventeen times; six of the operations were under chloroform (one of these being amputation of the breast), and eleven under some local anæsthetic such as cocaine. Under the knife a secondary growth appeared every seven weeks on the average. As these formed they were successively cut out in the early stage until at last the sternum became involved, when further operation was considered inadvisable and the case given up as hopeless. This was in 1907, when she came under the treatment; since then new growths have only appeared in few places, one being in the other breast. These as well as the older growths, all of which are extensive, are disappearing satisfactorily. Though the first appearance was some four years ago and the number of metastases have been over twenty, none of these have been internal, they have all been external, arising about the chest and in or about the axilla, that is near the breast where the growth originated. Had the evil been constitutional and widespread in the blood or serum, the only sound inference possible is that its appearance would have been both internal and external, and scattered about in different parts of the body.

It is sometimes claimed that erysipelas has often caused the disappearance of cancer. In the beginning of the treatment erysipelas was one of the secondary effects produced by it ; after considerable experience and by observing its influence in many phases of the growth the conclusion arrived at is that its effect on cancer is in no wise beneficial, and changes have been made in the solution to prevent it from being artificially induced. It was welcomed at first as likely to be of ancillary service to the treatment, but from the experience gained it would require stronger proof than is at present available to convince the writer that erysipelas is of any good in checking the growth of cancer.

Some years ago compression was supposed to be a cure, but extensive experiments failed to justify anticipations. One can understand that this method by constricting the blood vessels and starving the cells by cutting off the supply of blood, should have some check on the proliferating process, but, like erysipelas, an ancillary or subservient help is far from being a primary or principal one. In the treatment with which we are dealing the inflammation leading up to the formation of abscesses acts as a compress and gives useful help, no doubt, but the chief feature is the direct chemical action of the solution in the destruction of the nucleus and the disintegration of the cell protoplasm.

It will be understood that most of the conclusions arrived at are inferential; a good deal of microscopic work is required for their confirmation or modification. The kind of cells in the pus coming from the abscesses after treatment will doubtless, on examination, throw a good deal of light on the way in which malignant tissue cells are destroyed.

Before leaving the subject of the relationship between erysipelas and cancer, it may be suggested that it would be a very interesting research to work out microscopically more fully than has been done this relationship between the two. Erysipelas, as is well known, is due to the germs staphylococcus and streptococcus pyogenes, which by their irritating action produce inflammation and subsequent suppuration when present in an active condition in the system. They are present everywhere and can be cultivated quite easily. It is said to be owing to the presence of these when cancer has developed to the ulcerated stage, that the rodent action of the ulcer is due. In some cases one would almost be inclined to look upon the ulcer as a safety valve to relieve the body of the poisonous effects of the cancerous serum did not these pyogenic germs by a countervailing poison nullify this purpose. The mischief thus wrought has long been recognized when their action being outward was manifest to the eye. But it raises the question whether some of the evils

wrought by cancer may not be aggravated by the presence of these nefarious germs before the ulcerating stage is reached, and even the further one whether the origin itself of cancer may not be due to this evil.

In so many cases, especially of cancer in the breast, as we have already seen, the origin is referred to some particular place where a blow was formerly received as to make the inference too strong to doubt that the blow was the beginning of the trouble. The consequent result of the blow would be inflammation as the result of the destruction of the tissues, in addition to the action of the leucocytes, it may be a case of pyogenic infection, which in turn induces proliferation in the weakened cells of injured tissues.

Or on the other hand, assuming that these germs have no place in setting up proliferation in the normal cells, but that this takes place from some other cause, and that erysipelas is a secondary effect, though this in some exceptional cases may be apparently beneficial in checking the growth of cancer generally, it will be found by its own baneful effect to seriously increase the evil wrought by the malignant growth itself.

It may be remarked further in this connexion, especially with regard to ulcerated cancers, that the pit of the ulcer is generally free from cancer itself, whilst all around the everted or inverted edge lumps

of cancerous growth can be recognized distinctly by the fingers beneath the skin. These are continually bursting and becoming fungoid, the cancerous elements running out with the fœtid matter; the ulcerated area in which the pyogenic elements exercise domain thus receives whole slices of freshly added territory, the lumps disappearing in favour of a more merciless and more destructive foe than themselves.

It may be possible that an examination of the germs in an ulcerated cancer has suggested the theory so long held that cancer is parasitic; it may also be possible that the disappearance of the lumps has given a false impression regarding the removal of cancer by means of erysipelas; but the latter only takes place when the destruction of the epidermis brings the growth to the surface, and thus makes the raw exposed surface the happy hunting ground of foreign microbes. The further study already suggested of the relationship between cancer and erysipelas will probably show that the growth of cancer is favoured, as already stated, like that of torula by the limited supply of oxygen, and that when exposed to the air its destruction is due to the presence of this element rather than to the effect upon it of the rampant pyogenes.

If this reasoning is correct it will therefore follow that these two evils will require two distinct and separate kinds of treatment, and it is perhaps the

failure to recognize this dual or perhaps more multiple nature of the difficulty which has led to the unfortunate conclusion formed by so many who have studied this subject that cancer is one of the diseases which will ever remain incurable. It may be urged by some that this reasoning is only speculative or at the best *à priori*; but this objection would by no means be correct. Difficulties with ulcerated cases have forced this reasoning upon the writer; the increased trouble in dealing with cases which have reached the ulcerated stage has compelled him to seek an explanation of these difficulties, and the one just given seems to be the most reasonable. Additions to the treatment making it differential in its action on the lines indicated, good results from which are coming to hand from various quarters, confirm its soundness, and although advanced with all reserve pending further confirmation, it is believed that its correctness will be finally demonstrated.

In this connexion it may be of interest to relate how the inception of these views was suggested before attempting to carry them out in their practical application to the treatment of cancer.

One fortunately not very common disease is that somewhat loathsome one known as phormisis, which attacks the foreskin of the male and if not checked induces cancer, in many cases the inguinal glands becoming affected. Some time ago a victim to this

disease was brought to the notice of the writer; the sufferer had always lived both physically and otherwise a clean, healthy life, in fact he had been for fifty years without any medical help; he was, however, somewhat diabetic, a condition which no doubt would predispose favourably for the disease. The disease itself was somewhat complicated by frost-bite, symptoms of erysipelas were present, and serous discharge was continually forming. The place was kept too clean generally for the latter to accumulate to any great extent; but when it came in contact with the air it oxidized to a dirty yellow, and then ate into the flesh, forming raw ulcerated places which appeared as if cut with the knife. The man's absence from home for a day and two nights without opportunity of cleansing led to an accumulation of fœtor which seemed to be practically identical with that resulting in the case of cancer. At the time the importance of confirming this identity by the microscope was lost sight of, though now there can be little doubt of it.

Seeing that cancer is induced by phormisis, it was naturally inferred that the solution which destroyed the former would be effective with the latter; but on applying this it was found to give no help at all in this direction, but rather that it irritated if anything and aggravated the disorder instead of removing it. A change was therefore made by using a solution

altogether different which in time completely cured the disease, the serum ceasing to discharge and the tightness forming a ring in the foreskin relaxing to its usual condition.

It was this experience, the failure of the original solution to cure the new disease, and the discovery of a new agent which was effective, coupled with the knowledge of the difficulty in preventing the formation of ulcers in cancers of old standing, and of healing ulcers already formed, which suggested the thought that though solution number one might be, as results had proved, capable of destroying cancer in its early stage, and even in some instances those of a very advanced character, the difficulty just mentioned might have its explanation in the theory advocated. The case of Mr. Neal, mentioned later, seems to point strongly to the soundness of the theory—it is such an advance on what has already been achieved by the treatment.

The action of erysipelas before ulceration begins is evident in two ways. It forms a hard, indurated shield of the dermis and epidermis which is quite colourless, but somewhat dead over the growth; this is sometimes confused with the cancerous growth itself, this being specially the case with growths unoperated upon with the knife.

When the knife has been used, instead of this hard crust there is a softening of the overlying tissues,

blotches of a pinkish hue begin to form owing to extravasation of blood from the capillaries which are acted upon by the germs of erysipelas. In the former case their eruption through the skin may be long delayed, but in the latter it is a matter of short delay; and as the action is generally over a wide area before this eruption begins, when it has begun the ulcerated open sore generally is soon very widespread.

A case, that of Mrs. Wilcox, was being treated at the time the theory was under consideration. It was an extreme case; the operation had taken place two years previously, the right breast having been amputated.

Recrudescence had occurred, three separate lumps coming, almost as large as eggs, one on the extreme left of the cut, one in the muscle joining the arm to the sternum, and a third on the side and approaching the back. The two former consisted of cancerous tissue solely, the third was cancerous, not only with a thick lump but with flattened patches surrounding it; this was the most serious growth of the three, since it was aggravated by the presence of the pinkish blotches already referred to in various parts.

The two solutions were used here with very good effect, the coloured patches immediately becoming normal in appearance and the lumps of cancer yielding more readily than usual. Without this modifi-

cation of the usual treatment, though there might have been a chance of the patient's recovery, there would have always been this danger of the inflammatory erysipelas germs producing a state of ulceration difficult to deal with.

There is no doubt that cancer cells spread and are disposed in different parts of the body, and that metastases are formed where these cells deposit in organs and tissues far away from the primary growth. In some organs the diagnosis is easy and the location easily ascertained, though the deposit may be at some internal position. It would appear probable, however, from the above theory that the general disturbance of the constitution which is generally attributed to the cancer germs was the effect rather of the pyogenes or similar unicellular organisms, or the poisonous products from these, the latter for a time being neutralized by the action of the phagocytes, the cell scavengers of the blood, until it becomes too great, when the dangerous cachectic condition is reached.

The terms benign and malignant are used to denote the difference between growths that are practically harmless and those of a dangerous character. It has been contended previously that all abnormal growths are fundamentally alike in this, that they are all due to excessive cell proliferation in the tissues in which they occur.

Assuming this to be correct, what can be the explanation for the above difference in their effects upon the body? The malignin, a virus supposed to accompany cancer or to be secreted from it, has been suggested as the probable cause, but this can only be the pus or serum resulting from the breaking up of cancer cells; there is nothing at all of a glandular character in cancerous tissue which could secrete anything specially poisonous, and the former would be cleared along with the ordinary effete matter of the system through the ordinary channels.

It seems therefore highly probable that to account for the malignancy which so often characterizes cancer and leads to fatal results, we have to look to some external adventitious explanation to which the serious complications are due. Granting this to be the case, and seeing that pyogenic effects are serious when the growth has far advanced, it seems a natural inference that these germs are acting all along as the growth develops.

In the benign growths slow advance is made; the normal cells having some power of resistance accounts for this. On the other hand, if accompanied by the pyogenes, we can easily see how the power of growth and the capacity for malignancy can be vastly increased; these germs with an irritating action on cells surrounding the abnormal tissue would be a pioneer army, a guerilla force which would break

down the resistance to the attacking cancer and make the way easy for its further advance.

The difficulty of transplanting cancer from one person to another, or even from the seat of the evil to another part of the body of the same person has already been dealt with, and can only be overcome by taking away the scaffolding cells and transplanting them with the cancer cells. How, then, is this difficulty overcome in the spontaneous spread of the evil? If cancer originates in the breast, there must be the same resistance in the lungs or liver or uterus or any other part of the body to the floating cancer cells which is found when an attempt is made to fix them by extraneous effort. We can only infer that there is some agency to break down this resistance in the tissues which when overcome allows the malignant cells to get a hold and then proliferate.

By observing what conditions prevail when metastases form most numerously around the primary growth, we should be able to understand the reason of these secondary deposits being so prolific.

In the early stage of growth these rarely form—they come without any apparent outward change; but as the growth develops, inflammatory symptoms begin to show all around the growth, swelling takes place accompanied by much discoloration, showing a great amount of irritation around the cancerous area. Evidently the pyogenes have got a firmer

hold, and to them is due the serious aggravation of the trouble. This is the time when the cancerous deposits manifest themselves both in proximity to the primary growth and at a distance from it. We have seen how phormisis, which is largely due to the pyogenes, very often leads up to cancer ; we see how, as above, they account for increased malignancy when cancer is already formed. It seems probable therefore that the scaffolding cells, intermediate in position as they may be between the proliferating cell and the normal cell are in a degenerating stage brought to it by the attack of the pyogenes ; and in this state of degradation the further influence of the cancer cells, or even without it, causes them to proliferate, or so influences them as to make them a suitable resting place for the cells already proliferating, and thus further cancerous tissue may be formed.

If this could be established, it gives us the key to the difficulty concerning the spread of cancer. The cells forming this may be present in the blood ; so long as the body is healthy and normal their settlement or growth is impossible, but when some local disturbance takes place leading to irritation and the activity of the pyogenes, their opportunity comes, and they become fixed at the seat of the trouble.

The discussion of this aspect of the question will show how impossible the knife is as a means of clearing these malignant growths.

On the other hand, it confirms the practice of treating them with a solution directly into the tissue, also of using a second one to destroy the pyogenes, and a third one which shall, if possible, have the combined properties of the two taken internally as a medicine.

It has been remarked as a special feature in connection with cancer that the liability to its occurrence is greatest at the junction of two different kinds of tissues, for instance at the lip where epidermal and epithelial tissues meet, at the entrance to the stomach where the epithelium of the œsophagus joins with the different coating of the stomach, at the junction of the rectum and smaller intestine, and especially is this true in the uterus, the cervix and the vaginal passage where the cells lining these vary so largely. And at all these places ruptures or abrasions readily take place.

We have mentioned how a jagged tooth or a dirty pipe can make an abrasion in the neighbourhood of the lips, some hard substance passing from the œsophagus through the restricted orifice into the stomach, or hard matter passing from the intestines into the rectum can easily tear away the delicate linings of any of these. Whilst in connection with the uterus the violent movement at the time of parturition and the changes that take place in connection with this organ render it and the surrounding parts so liable to injury that we are not surprised that it

should be at the top of the list of places liable to malignant growth.

Statistics showing the difference in liability to this between women who have had children and those who have been childless are very startling. The fact that cancer in this position begins in some scar in the healing of which atypical epithelioma has formed is undoubted, and in all the four positions named it is highly probable that inflammatory symptoms have supervened on the wound as a prelude to the formation of cancerous growth. Whilst in the case of phormisis already referred to, before the formation of the small ulcerated sores, at the junction here again of epithelium and epidermis inflammation with the presence of the pyogenes has taken place. So that when inflammatory processes can be proved so often to lead up to cancerous formations, it is not requiring too violent a wrench on one's credibility to accept the natural inference that when once this has begun, the same means can disseminate the growth, and break down the normal resistance of the constitution to this extraordinary cell proliferation.

Many who have had wide experience with advanced cases of cancer will have observed the formation of a cicatrix or seam formed of cells or tissue totally different from those forming the cancerous tissue, and running across the latter.

One such case occurred in the tongue in the case

of a man who had all this member infiltrated, the seam began and formed a stricture all round the anterior third part. It forced its way down through the muscles and ultimately cut off this portion of the tongue as though it had been severed with a knife, each face where cut being fairly healthy. The same often occurs in the breast, especially around the nipple, the stricture generally forming after the tissues of the milk ducts round this point have become dense and hard, and the circulation on account of this has been totally or partially cut off. The seam, a circular one, forms and cuts off a portion with the nipple as centre some two or three inches in diameter, this portion ultimately falling away, leaving an ulcerous surface exposed. Cases such as these have been difficult to deal with, even when the remainder of the breast has been progressing favourably, this new development or complication has advanced and continued in defiance of all attempts to overcome it. The cicatrix or seam in all these cases is so different from the normal or even cancerous tissue, that no one would confound it with them. Since the modification in the treatment, however, one of these cases on the breast where the scar had formed nearly two-thirds of the way round the nipple has been found to improve, and the affected area is joining up again at the seam, and the whole breast including this portion is now practically cleared of growth.

What meaning do such terms as "malignant" and "benignant" convey to the lay mind or to the professional when used in connection with these growths? Or what change has come over the harmless tumour when it develops into a malignant cancer? Where is the borderland between the two? No explanation is given in any of the treatises dealing with the question, yet from the above this seems to be capable of a simple explanation. To see as one has had the satisfaction of seeing lately in several cases the reversion of malignant growths to those of a harmless nature has been both interesting and instructive, especially when this has been preceded by failure in so many similar cases. The explanation is almost certain to be a most simple one, and when once recognized the surprise will be that such an explanation was not discovered much earlier.

The difficulty of transplanting cancer has long been known, yet the ready way in which cancer spontaneously spreads in the body has prevented the truth being appreciated that the same resistance has first had to be overcome before this has taken place.

Yet here again the explanation may be easy, and by the way this explanation has been forthcoming, it gives the greatest hope in connection with this terrible disease, since it shows that the body generally instead of being predisposed or favourable to the attack, as is sometimes supposed, may be really

fortified against it, and therefore if it be necessary for cancer to have some ally to receive help from before it can overcome this resistance, if we can cut out or destroy the latter, we can prevent the attack of the former from being successful. A confirmation of this theory would give the greatest impetus to those who are grappling with this evil, and hold out much brighter hope of ultimate success.

In a later section more personal details are given of the individual cases which have been treated successfully. The question might, however, be asked as to what the proportion of these cases is to the total number treated. The writer has, however, withheld this ; percentages where such extreme cases are included would be more misleading than giving the number of those who are cured, especially when it is remembered that some patients have given up the treatment who could not bear the pain, without giving it a fair test. So many extreme cases have also come for treatment, the successes in treating which, though fairly numerous under the circumstances, would lower the percentage unfairly and would give an erroneous impression of the general effectiveness of the treatment. As has already been stated, the formation of cancerous tissue has its early initial stage in each individual case, and it is far better to point out how at this period there is such a good chance of success than encourage pro-

crastination by laying stress on the fact that there is a chance, though a considerably reduced one, of recovery where the growth has been allowed to get firm hold for too long a period without treatment.

Very few cases in the early stage have been lost. A fair estimate would give some ninety to ninety-five per cent. of the cases treated as soon as they are discovered as a probable percentage of success; this is as near a guarantee of cure as can be reasonably expected. The thing is so insidious, however, that no sane man would give an absolute guarantee of success however sure he felt in his diagnosis of the growth. Any one foolish enough to give such a guarantee should be shunned by all who are attacked, whether the growth is in its early or later stage, as one quite unfitted to deal with so terribly serious an evil.

There is also another difficulty with any new method. So many sufferers have the truth kept from them that they are unaware of their position, both patients and friends being kept equally in the dark. As an illustration a man came to the writer for consultation. He was in the cachectic condition supervening on a cancerous attack on the larynx; he was accompanied by his wife. Both of them were in complete ignorance of the truth, though the man passed away in less than a month. When a treatment becomes thoroughly accredited, in cases where the treatment

can be applied, any one contributing to ignorance of this kind will be held culpable.

There is this good feature about cancer, speaking generally, and that is that its growth in the initial stages is comparatively slow, and the opportunity for successful treatment correspondingly favourable. At this stage, too, the metastases seldom occur, so that whatever limitations restrict the treatment in cases that are far advanced, these do not obtain, except in very exceptional cases, in new growths.

A treatment which is practically uniformly successful in the early stage is to be preferred to one which may be only spasmodically successful in any stage, since all these growths pass through the stage when they are a very small lump. Each case, with very few exceptions, if taken early enough has its opportunity of relief.

The question will naturally arise, "Is the cure a permanent one, or does the evil soon return?" In reply to this question one can only give results.

It has already been stated that in the first case there has been no recurrence in the years which have elapsed since the treatment was first applied. The difficulty here again is with the secondary deposits; these, arising as they probably do from single cells of a microscopic size, may be in the serum or blood or even have been deposited *in situ* and not develop for months. If this is the case the primary growth

and some of those of a secondary nature, may have been destroyed, and those referred to above may appear later. If they are external there is not much trouble in getting rid of them; they are only out of reach, and therefore fatal, when they develop internally. Taking the cases all round, and considering the length of time the primary growth has had to develop, internal deposits of this kind have been remarkably few.

There is another question to consider, and that is the predisposition to cancer. Although the heredity of cancer is now, as we have seen, generally disputed, this hereditary predisposition is very often accepted. If the patient is delivered from the first attack, will others follow? A satisfactory answer to this question can only be given when a sufficient time has passed and enough experience obtained to give confidence. The first case gives some affirmative evidence to this question, the more recent cases confirming in a less strong form owing to the shortness of time which has passed since the cures took place. Yet though it is only claimed for the treatment at present that it will only be successful when injected into the growth directly, it is hoped that tests may show that it will have further effects, and have an inoculatory influence on the body in general sufficient to prevent any further development. If the treatment where successful delivers the patient from the

immediate evil, it is only fair to the treatment to recognize that if the patients are liable to further attack, it is only what those who have never suffered are equally or perhaps more liable to. Granted that the method of treatment is successful, that the patient is on the alert for further developments, the recurrence will not be the serious matter that it has been formerly, since from being absolutely incurable if attention be drawn to it at once there is a fair chance of its being cleared.

In many cases where growth in the breast has been removed, glands in the axilla or neck have made their appearance; these have been taken in time, and their disappearance has quickly resulted.

One drawback to the treatment is the pain inflicted upon the patients; further experience, it is hoped, will help to alleviate this. There is this to be said, however, to the credit of this account, that it is the substitution of one pain for another. Those inflicted take away the dreadful sensations similar to acute neuralgia which the encroachments of the growth on the nerves create, especially those in the head arising from growths situated in the tongue and sides of the face. As we have already seen, although morbid growths are practically parasitic, they are not only supplied with blood from the general system, but are also under the same conditions as the body generally with regard to the nerve supply. Their

sensitive condition is equal to, in some cases greater, than that of normal tissues, but pain has to be borne and the old Puritan general's advice followed when he tried to inspire his troops with the words, "If you do not kill the enemy the enemy will kill you." There is no doubt that in several cases which have ended fatally where the treatment has simply prolonged life, there has been an absence of the acute, excruciating pains which mark the end of this disease, several medical men who have had patients under observation having voluntarily given their testimony to the truth of this statement.

In placing the results obtained side by side with those of other methods, this has to be done with the greatest care. The proverb, "Comparisons are odious," is perhaps more true in this instance than in any other; caution, too, has to be exercised lest hopes be raised too high in cases where the growths are too advanced for any treatment. This may be said about the knife, that in many cases where the use of this instrument has been abandoned and the case given up as hopeless, the treatment has been applied with entirely satisfactory results. Unfortunately the reverse of this cannot be stated, since in some six or eight cases medical men ignorant of the treatment have in spite of this ignorance recommended patients who have been under it to have the use of the knife; yet in all these cases there has not

been a single success, though some of these were progressing favourably under the treatment. If compared also with the results which Sir F. Treves claims to have been obtained from radium, these results will be found insignificant in comparison with those obtained under the treatment which we are now considering.

The writer wishes to make all reserve in giving an account of the treatment, to understate rather than overstate the results, and to point out as far as possible its limitations. It would be criminal, if not the act of a lunatic, considering the exceedingly serious nature of the subject, to make claim to results which could not be fully verified. The treatment, it may again be stated, is no quack nostrum guaranteed to cure every attack of cancer, however far advanced. There may be even some early cases beyond its power to deal with; but having made these admissions and having fully and frankly admitted these limitations, the results from a trial extending over a period of two years will be admitted by all to be something remarkable. To deal with these morbid growths and find any measure of success when all the medical world is admitting its inability to cope with them is highly satisfactory; but the results tabulated go much beyond this, and show not merely a few scattered instances of cures; their number is so great that they may without

exaggeration be described as wholesale. The writer not being medically qualified, the diagnoses if they depended upon him might be questioned. Such a great proportion, however, of the cases as will be seen on reference to the list have not only been diagnosed by local medical men, but also by surgeons of eminence in connexion with the largest cancer institutions, and the growths pronounced to be malignant, this view being confirmed by recrudescence with metastases in several places, so that no possible doubt can remain of their real character.

But whatever lack of experience the writer might have had in beginning the treatment the experience of two years has fully removed. The treatment of nearly a hundred cases systematically twice a week over the period just mentioned, the close personal contact with the growth which the use of the hypodermic needle implies, the " feel " of this instrument being after a time almost equal to the addition of an extra sense, these all combine to give a qualification for diagnosing which must be of a much greater practical value than a mere paper degree conferred by any college, however high its status, or the meagre practical experience accompanying it obtained by a few weeks spent in some hospital.

Another question that may be fairly asked is what view have the medical men taken of the treatment who have seen some of its results ? This is a some-

what difficult question to answer, since all the impossible cases naturally drift sooner or later into their hands; the impression made by these naturally cannot be a favourable one. There are some medical men who have diagnosed growths as cancerous, and who have either themselves removed these growths by the knife or sent them elsewhere to be removed by it who have known that recrudescence has taken place; and yet when they have known the growth to disappear by the treatment, have so far stultified themselves as to say that it was not cancer. Their method of reasoning is this. Cancer is incurable; this proposition is thoroughly ingrained into them, so that when a case pronounced by themselves as cancer is successfully treated, even if several operations have been performed as the result of repeated recrudescences, the fact of its being amenable to treatment, contrary as it is to the above proposition, is proof positive that the growth was not malignant and that the diagnosis was wrong. Reasoning such as this is parallel to and quite as absurd as that which led to the adoption of the test for witchcraft in the Middle Ages, bound and thrown into water; if the accused were innocent he sank and was drowned, but if he were guilty he managed to swim and was hanged.

Other medical men have been as broadminded as possible. Having seen the good effects in certain

cases when their own patients have been attacked, they have pointed out the treatment to other patients and have advised them to adopt it, with good results. Knowing how incurable cancerous growths have so far proved, some medical men having been sceptical, and having scoffed at the beginning, have asked patients to allow them to watch the effects of the treatment, with the result that they have retracted all they have said in its depreciation, and instead of cursing have given the treatment their blessing. There are some who have been opposite to all this, whose criticism has been unfair and whose condemnation has been unjust. One does not, however, wish to dwell on these ; prejudice against a remedy from an unorthodox source is perhaps natural, and in these instances allowance has to be made. To look back at the conception of the treatment to find that the writer at the first attempt by its agency should be successful in effecting a cure of what has been considered an incurable malady seems almost incredible, and blame can hardly attach to those who, knowing nothing of its history, receive it in the above manner.

There is, however, a question suggested by this success, and that is, Have those who have sought out a cure proceeded on right lines ? and have the methods of research in this direction been too conservative to meet with success ?

That the treatment is the final step in this direction the writer does not for a moment claim ; the method of treatment he believes will certainly be adopted. The difficulty has been to get some first step assured ; this assurance the treatment fully guarantees. Further modifications of a helpful nature are as sure to be made as those that have already been made which have improved it since the first application.

It may be pointed out here that there are certain glands liable to cancer the removal of which by the knife is absolutely precluded. Amongst these are the glands of the neck in the neighbourhood of the chief blood vessels leading to and from the head. The main growth it is sometimes possible to cut away, but the finer ramifications from it, intertwined amongst these veins and arteries, it is unsafe and impossible to remove with such a crude instrument as the knife. In most cases, however, with ordinary care it is possible—if dealt with in an early stage—to inject the solution near enough with the needle to not only destroy the central growth, but also the finer branches without any risk of causing lesion in these vessels by puncturing them. It is a great temptation to a surgeon where it is impossible to cut all the growth away to seek to alleviate by a partial operation. The writer has already expressed himself against a partial operation as likely to irritate and

cause increased malignancy, and several instances could be cited where this has been done in the neck, with this unfortunate result.

In describing the action and effect of his treatment of this insidious and cruel foe to humanity, the writer has striven to be perfectly fair and candid. It is quite easy in obtaining success in this direction to exaggerate, but knowing fully the serious nature of the case, he has recognized the limitations which must surround this or any other attempt to gain a mastery of this terrible trouble. In criticizing the knife and other methods, every effort has been made to keep the criticism fair, and even sympathetic. It is impossible to imagine any one with such an experience as the writer has had adopting any other attitude. There will no doubt be opponents of the treatment in spite of proofs of its success in early stages, but on one point all will agree who are engaged in the fight with this scourge, and that is that delay, the putting off till to-morrow of the treatment is most foolish; the "manyana" of the Spaniards is death in this instance, whereas prompt treatment gives a good chance of relief.

Having, however, made every admission regarding the limitations of the treatment and its ineffectiveness in some very advanced cases, its successes are too numerous to be ignored. To use the words

of the *British Medical Journal*, already quoted, it comes as "a deliverer from the fell scourge," and in spite of any failures marks the destruction of malignant growths as *un fait accompli*.

CHAPTER IV

Forth then issued Hiawatha,
Wandered eastward, wandered westward,
Teaching men the use of simples,
And the antidotes of poisons
And the cure of all diseases.

Longfellow.

CANCER, as we have seen, is incidental to all parts of the body, especially to those of a glandular structure. It occurs both externally and internally, the greatest percentage being found along the alimentary tract.

The following table, taken from the Registrar-General's sixty-first annual report, shows the localization of malignant disease as indicated by mortality returns for England and Wales :—

TABLE III.

Males (9,932 cases).	per cent.	Females (15,204 cases).	per cent.
Stomach	21·4	Uterus	23·5
Liver and Gall Bladder	13·4	Breast	15·8
Rectum	9·6	Liver and Gall Bladder	13·5
Tongue and Mouth	6·4	Stomach	13·2
Intestines (ex rectum)	6·1	Rectum	5·3
Œsophagus	6·0	Intestines (ex rectum)	5·2
Skin	4·1	Abdomen	2·0
Bladder	2·8	Peritoneum	1·8
Jaws	2·7	Ovary	1·6
Face	2·0	Œsophagus	1·5
Pharynx	2·0	Skin	1·0
Larynx and Trachea	1·8	Bladder	0·9
Lips	1·6	Jaws	0·8
Testes Penis	1·6	Face	0·6
Prostate	1·0	Tongue and Mouth	0·6
Breast	0·2	Lips	0·2
All other localities	17·3	All other localities	12·5
Per cent.	100·0	Per cent.	100·0

Roughly speaking, successes can be claimed for the treatment where it has been applied in places attacks upon which in the case of males (see Table) have been responsible for fifty per cent. of the deaths, and in the case of women for sixty per cent. of deaths. It is probable that success might be shown on a higher scale if the treatment had been adopted earlier, as death occurs very often through metastases forming in internal organs, which have developed from an attack on some external position. It is worth noticing in passing that in the case of women, although

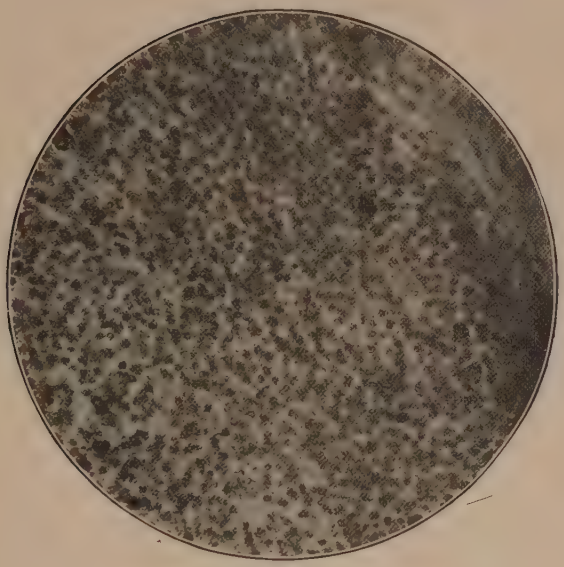


PLATE III: × 3,600.

Section of mixed sarcoma of the femur; cell division is proceeding at a rapid rate, several cells subdividing into two or more cells each with its separate nucleus. In some cells the nucleus has subdivided. The cell as a whole subdividing later. This cell proliferation or redundancy is the characteristic of malignant growths and is manifest in all the later sections.

the fatal cases are fifty per cent. more than those of men, if we take away those deaths resulting from cancer of the uterus and cancer of the breast from the former there are fewer cases ending fatally amongst women than amongst those of the opposite sex.

The places where the treatment has been applied in certain cases with—as far as can be ascertained—complete success are the breast, uterus and neck of uterus, rectum, skin, jaws, face, tongue and mouth, lips, chin, back, side, neck, head, arms, axillæ. These have been primary growths, secondary deposits have formed in neighbouring glands, which have also, in a good proportion of cases, yielded to the treatment. In several cases where the bone has become infiltrated with the growth, and where these cases, as a consequence, have been given up as hopeless and considered as inoperable by the knife, the treatment has not only cleared the tissue of growth and separated it from the bone, but removed all growth from the latter as well. In case No. 10 on the list, after removal of the right breast, the upper third of the femoral bone on each side, the left collar bone and the ulnar bone of the left hand were all attacked; these were all cleared but, unfortunately, through a fall the left hip was dislocated and fractured, other complications which supervened prevented the patient's recovering, though the cancerous growth had all disappeared.

The Leeds Infirmary have skiographs of the growths; if the Committee would have been kind enough to lend them they should have been reproduced in these pages, with a second set, showing how the bones attacked appear when cleared.

The place where the greatest success has been obtained has been the breast. It is really surprising how many women have these lumps and are unaware of their existence until some violent wrench or other accident leads to their discovery; too much insistence cannot be used as to the necessity for early attention being paid to them; the axillary glands are near, the attack on which leads to the "brawny arm," through pressure on the serum glands and the blood-vessels in the neighbourhood which supply the arm. Following the axillary glands comes the turn of the cervical glands to be infected, the nearness of which to the blood-vessels supplying the head makes the use of the knife impracticable. Experience shows that in following this course, the growth often strikes through and fastens on the lungs, where nothing can check its fatal ending. Apart from this latter development, as a rule the appearance on the glands just mentioned is the despair of the operating surgeon. But here the needle, as a finer instrument than the knife, has been successful where the use of the latter has had to be abandoned.

Case No. 5 was given up at the Manchester Royal

Infirmary as absolutely incurable, after amputation of the left breast. The growth reappeared in the axilla, on the sternum muscle, on the cervical glands and on the breast bone. In addition to the difficulty of operation owing to the widespread nature of the growth, through the shock of the operation the weak condition of the patient absolutely precluded any further use of the knife. After two years this patient is now alive and, as far as can be seen, is quite well. When re-growth takes place as a rule further use of the knife is absolutely hopeless, yet the case referred to is taken as typical, several others being like it, as reference to the table at the end will show. In the first successful case after operation, eighteen years have elapsed since this took place, in the others two years have gone without any sign of recurrence.

Fibroid tumours have been removed from various parts of the body. Taking case No. 48 as a type, this was a very large growth the size of an orange; it soon, however, yielded to treatment and has now completely disappeared. Fatty tumours, though not often fatal if they occur externally, sometimes multiply so as to threaten dangerous consequences. In case No. 30 there were three on the left arm and one on the right arm; these yielded rapidly to treatment, and although, owing to their number, the injections into each tumour were few, about six applications were enough to destroy them, the pus

and disintegrated cell matter coming away almost like melted butter.

To those most familiar with and who have had extensive practice in dealing with cancer it will cause no surprise to say that cases of epithelioma are more difficult to deal with than those of sarcoma. Its spread, if not checked in the earlier stages, is so rapid and when it begins in the mouth or throat, on the tongue or face, the numerous glands in these parts are so readily affected that success, when once a hold of the scourge is obtained, is a matter of extreme difficulty. However, even here several successes have been obtained, some of them after operation. Case No. 12, though operated upon, and after the operation the patient being absolutely assured by the surgeon that there was no hope, yet after two years is alive and well. Several cases of epithelioma on the lip after extensive operations have been successfully treated. In Case No. 2 part of the lower lip had been removed and the cut continued to the ear on both sides; after two years recurrence took place with ulceration of the lip, the growth also filling up the depression between the curve of the lip and the chin; here the growth was destroyed, and the ulcer gradually disappeared, and the patient as far as can be ascertained is quite free from growth.

[The illustration is that of an epithelioma on the lip (Case No. 40). It was a troublesome somewhat

advanced case, with the somewhat disfiguring ulcer about as large as a thimble, with widespread growth all around it. In treating it little progress was made at the beginning, but the rate of improvement gradually increased and the patient has now quite recovered.]

Fig 16.—Fungoid excrescence in the case of epithelioma of the lip. It is now completely cleared together with a large non-ulcerated portion extending nearly to the chin.

The tongue is however the worst position in which to deal with cancer; as we have seen in a previous chapter, some surgeons have operated for a lifetime without meeting with a single case of success. And whatever method is adopted in dealing with it, early application is essential if satisfactory results are to be obtained.

It ought however to be said in favour of the treatment, that in most cases of failure with the tongue the growth has generally been far advanced and has either been operated upon by the knife, or been too far developed for this instrument to be used. Coming on the tongue, as the growth does, as small papillomata or warts, before it has struck down into the muscles and blood-vessels, what a pity that at this

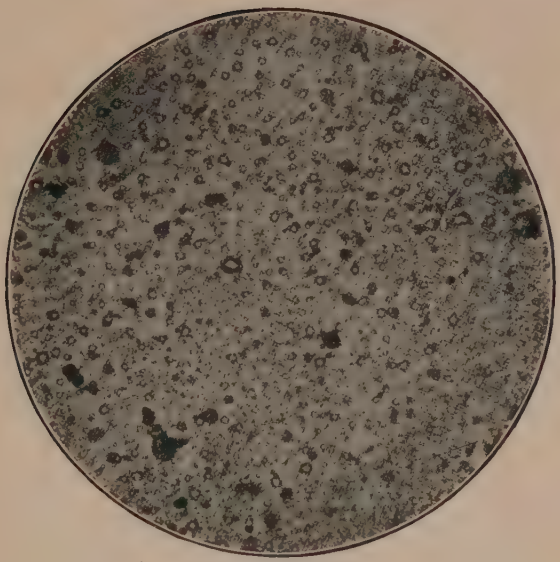


PLATE IV: × 4,900.

Section of cancer from the rectum; many of the cells in this have been destroyed by the treatment.

early stage its treatment should be deferred, here especially its insidiousness lulls the unwary until a stage is reached when all hope of deliverance must be abandoned.

Case No. 7 is a good illustration of success achieved in relation to treatment of the tongue. The patient had an operation performed on the right side in the Manchester Royal Infirmary in March 1905. It was treated again in the same place in the Salford Infirmary in February 1906, and it re-appeared near the seat of the operation the year following (1907), with metastases in the cheek on the same side. The patient went for examination to the infirmary and arrangements were made for a third operation to take place as soon as a bed could be made ready. In the meantime, however, hearing of the treatment, he decided to adopt this instead of having the third operation ; this was in September 1907. The result was highly satisfactory, the growth in the cheek first disappearing ; later the tongue itself was nearly cleared of all traces. Those with most experience of growths on the tongue and the glands about the face will best understand and appreciate the importance of success obtained in such a case as this.

All the cases cited so far have been those of difficulty and worry. It is refreshing to dwell on a different one, serious enough in one sense but as far as the treatment is concerned comparatively light.

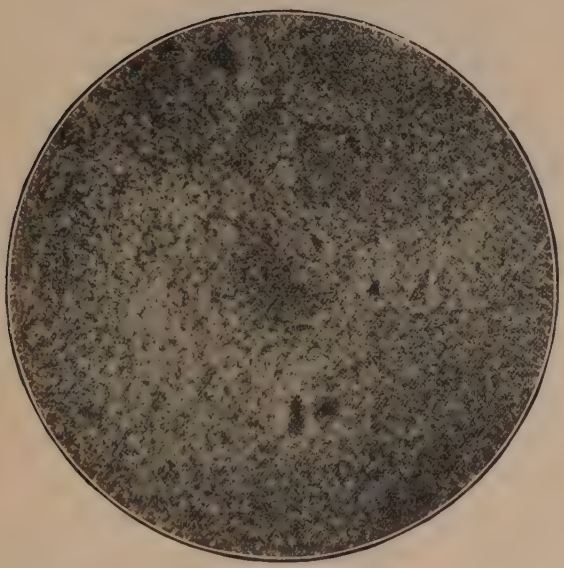


PLATE V : × 4,225.

Section of carcinoma of the ovary. In nearly all the sections the outline of the nucleus is made more definite by first staining the sections in carmine.

The case referred to is No. 35 on the list. The patient came for treatment in June of this year ; he had been to Leeds Infirmary for examination, where it was diagnosed as a case of malignancy. The main growth was near the right jugular vein. Another was at the base of the skull, later one of the left cervical glands was involved. The man was, as a matter of course, greatly depressed by the serious aspect of the diagnosis, but as the growth responded to the treatment and all was practically cleared in two months, he speedily regained his normal cheerfulness.

As stated in Chapter III, when the treatment was applied at first it was believed to be limited in its usefulness to external cases, and it was only after some time had elapsed that it was extended to cases in the rectum and in the uterus ; in the neck of the latter, also, the hypodermic needle has been used with some very good results.

The first case in the rectum was No. 11. The patient, at the time his wife came for consultation, was confined to his bed physically prostrated, his death having for some time been expected, his medical attendant assuring his relatives that no hope of his recovery could be held. Coelotomy had been performed and the growth was very far advanced, yet by injecting the fluid by means of an ordinary rubber enema, through the cœlotol opening and that of the anus, he was enabled in six weeks time to resume

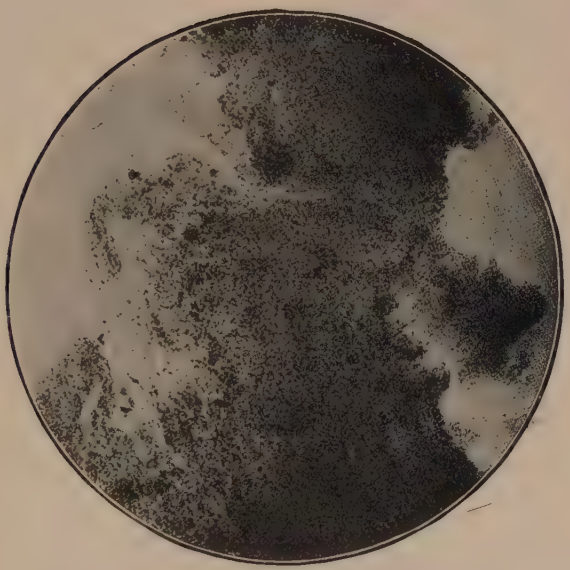


PLATE VI : × 8,100.

Section of cancer from the body cavity. This was a very advanced case, the uterus and ovaries having been removed some considerable time before the treatment with the solution, the latter considerably relieving the pain, and bringing away a good deal of the growth.

his somewhat arduous duties as signalman on the railway.

It will be seen on reference to the above statistics that in females the uterus is the place most open to attack. As in the rectum, the treatment has been applied here by means of the enema with beneficial results. In the case of Mrs. B. a healthy farmer's wife had been reduced to a weak condition ; she was brought from Derbyshire by her husband to consult a Manchester specialist, he diagnosed the case as hopeless and quite beyond operation. This was in February 1908, yet, though this is now nearly two years ago, she is so far recovered as to resume her work in attending the market.

In spite of these successes, however, one is compelled to speak with all reserve on the chance of success in both these situations. In the first place the work has to be carried on blindly and the result can only be known indirectly, and secondly they are both surrounded with large glands which are easy victims to the growth. Those in the groin—the large inguinal glands—can of course be reached and have been treated and all growth removed, but those in the body cavity, if affected, are out of reach of both the needle and the enema.

Though the treatment cannot claim absolute success in dealing with cases where both uterus and ovaries have been excised, the beneficial effects pro-

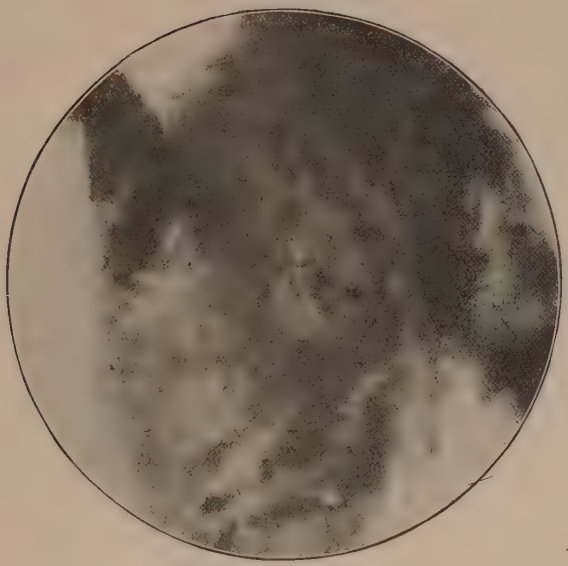


PLATE VII: × 3,025.

Section of a portion of cancer of the uterus like the preceding section detached and brought away by the solution. In these two and several of the others the cell contents including nuclei are disintegrated by the effect of the solution.

duced are worthy of notice. In some of these cases life has been prolonged from one to two years, and not only this, but the violent pains, which are a regular concomitant of malignant growth of this part of the body, have been almost if not altogether assuaged.

Several very advanced cases where the uterus and ovaries have been excised have come under the treatment, and extreme as the cases have been, if prolongation of life and the lessening of pain are to be considered worth securing, this has been accomplished; in one case especially life was extended nearly two years with comparatively little suffering, the medical attendant admitting that "whatever the means employed the results were simply marvellous."

At the beginning, seeing the results accruing to the treatment on its application to cancer and tumours, the writer wished to see what effect it would have on lupus and rodent ulcers; the opportunity of testing it on these soon came, and on the whole with gratifying results. No. 14 was the first case of lupus tried; it was in a comparatively early stage, situated on the right cheek just below the temple. It had been subjected to the Finsen light in Huddersfield Infirmary without responding in any way to the action of the light rays. But immediately on coming for treatment, to use the patient's own words, the first few applications took effect upon it as "nothing else

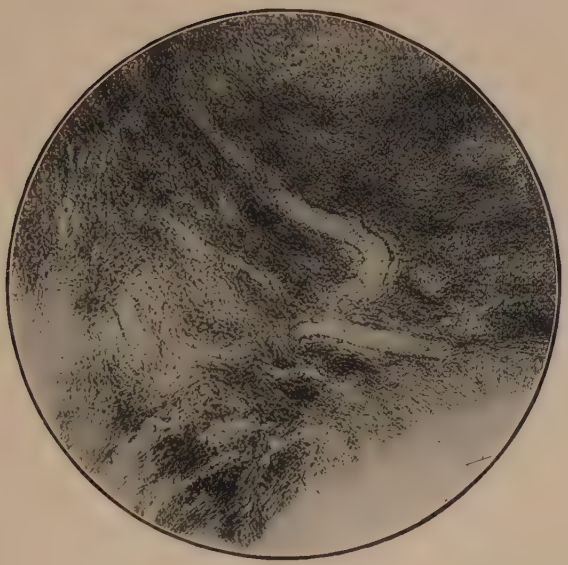


PLATE VIII: × 4,225.

Section of colloid cancer from the jaw. This is from Mr. Roger's case, and the cancer was practically dead when it was cut away.

had been able to do," and he is now free from this justly dreaded disease.

One of the most interesting cases dealt with is that of Mr. Harry Rogers. His was an attack of colloid or alveolar cancer. This consisted of two apparently fungoid growths springing from the right jaw bone, filling up the space between this and the cheek, and considerably distending the latter. They were about two inches by one inch in size, somewhat oblong in shape, each dwindling sharply near its origin in the bone to a stalk or small pedicel. The growth had been diagnosed at the Manchester Infirmary and the patient was advised to submit himself to an operation involving the removal not only of the cancer, but also of the jaw bone as well. This was some twelve months before coming for treatment. It was a somewhat repulsive sight to see these growths when turned out of the mouth, as they could be, by the patient's finger. Injections of the solution were made directly into the jaw bone at the base of the pedicels and in about two months time the growths were bloodless and dead, when they were cut away. Although this is nearly two years ago there is not the slightest sign of a recurrence, and a comparison between the two sides would certainly give the preference to the jaw bone from which the growth had been eradicated as the sounder of the two.

A common place where malignant growths arise

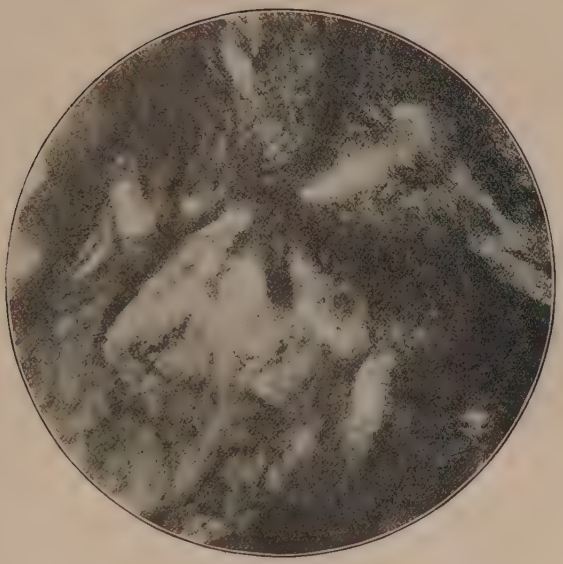


PLATE IX : × 4,225.

Section from colloid cancer on the hard palate. In this case ulceration had commenced.

is at the junction of the œsophagus and stomach, the latter organ being almost invariably plugged up in the course of time by a solid fleshy mass of cancerous tissue, the patient being kept alive as long as possible by passing prepared liquid food into his intestines at the junction with the pyloric end of the stomach.

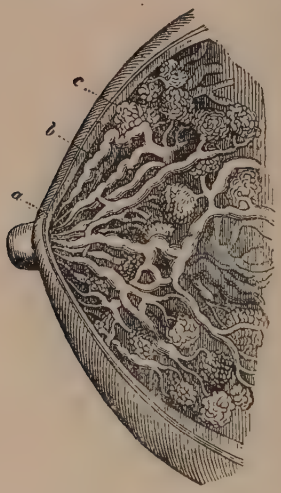


FIG. 17.—Vertical section of the human breast.

c, racemose glandular lobes; *b*, enlarged milk ducts; *a*, narrower outlets which open into the nipple. The origin of cancer is generally in one of the racemose glands; development generally takes place across the fibrous tissue in which they are imbedded to the other glands, this proceeding until the whole substance of the breast, both glandular and fibrous becomes one dense mass of malignant tissue.

The treatment has been applied to three such cases; in one of these only has the plug been removed, solid masses of cancer two inches in length by one inch in breadth and thickness coming away. The patient was enabled to take nourishment for a time in the ordinary way, but as it was impossible to follow the growth remaining in the walls of the gullet with the needle, it re-asserted itself and the passage was again closed, the relief obtained being only of a temporary character.

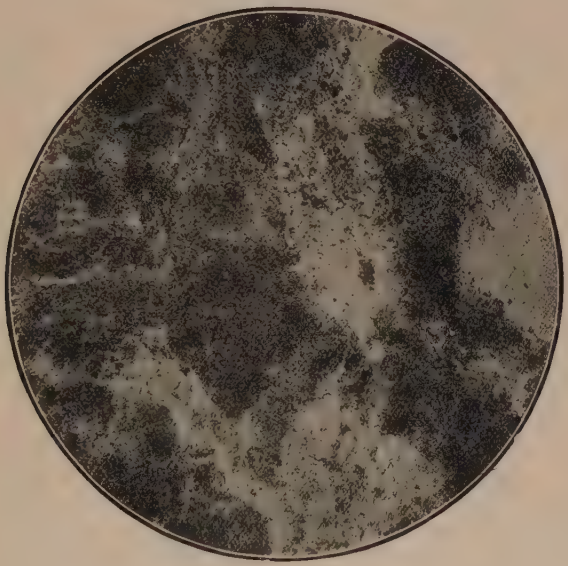


PLATE X: × 8,100.

Section of cancer at the junction of the œsophagus and the stomach. The opening to the latter had been plugged for a long time with the growth, the patient being fed through an opening in the side.

The action of the solution loosened large lumps of the growth, when food was again passed in the usual way.

From the list at the head of this chapter it will be found that in females the breast or mamma is the

FIG. 17*a*. Diagram of the breast showing *n* the so-called "retracted nipple."

In some cases at an early stage of the growth, this is confined to one or two of the racemose glands (*c*. Fig. 17). These enlarge as the one marked *g* above and generally the growth infiltrates the tissue in which glands and ducts are embedded, the whole mass becoming cancerous. But often the growth proceeds from the affected gland by way of the epithelial lining of the duct leading to the nipple. It then affects the swollen part of the other ducts. They all become enlarged and the surrounding tissue becoming involved, a hard dense mass almost impenetrable to the needle is formed. The portion of the breast just surrounding the nipple being pushed out gives this an appearance of being pulled in or retracted.

The density of this growth is often so great that the blood supply is cut off. This is followed by the action of the pyogenes which lead to ulceration which gradually spreads over all the breast.

place attacked most next to the uterus, one out of six being the proportion of malignant growths occur-

ring in this situation. From Fig. 17, where the breast is given in vertical section, it will be seen that this is practically an agglomeration of small glands; in these the milk is secreted, the ducts of which first enlarge, then becoming smaller coalesce in the nipple. It is this glandular structure which here as elsewhere, as has already been pointed out, makes it particularly liable to attack. Partial operation with the knife is worse than useless, any glands left are sure to be subject sooner or later to recrudescence. The growth generally originates in one or two of the glands, and the time may be short or long before the others are sure to be implicated. As the growth proceeds, the ducts are attacked and later glands, ducts, and connective tissue may be eaten away and be replaced by one hard, dense, homogeneous mass of cancerous growth.

Case No. 9, that of Mrs. Thwaites, was a somewhat exceptional one; some half dozen small, fair-sized tumours had formed on the left breast; they had been growing for over twenty years. The breast was considerably enlarged, and the tumours were, no doubt, becoming cancerous or malignant. There was a second growth in a line with the breast on the right side of the body, whether arising as an independent growth or as a metastasis from the original one it would be difficult to determine. It was, however, in the soft early condition and disappeared

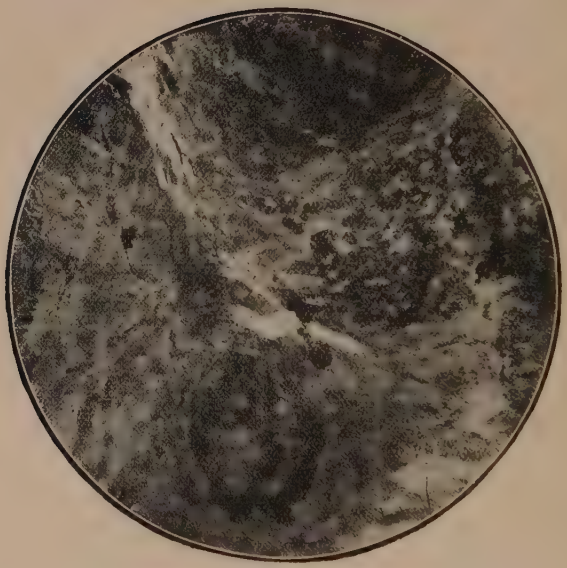


PLATE XI : × 4,225.

Section of cancer of the breast (mixed). Several giant cells are recognized in the field, here again cell-division is taking place at a very rapid rate.

without much difficulty. The growths on the left breast formed the *pièce de resistance*, but they ultimately disappeared, and the size of the breast was reduced to that of the other.

One of the worst cases which have been under treatment is that of Mr. Neal, one of Lord Roberts' veterans in the Afghanistan campaign, where he had a narrow escape from losing his life in a single-handed combat with a powerful Afghan.

The growth extended on the right cheek from the eye along the underside of the ear, over all the cheek and lower jaw bone, running out under the chin towards the throat. Internally it practically followed the same course, thickening the cheek very considerably except in the middle part where it had eaten a considerable portion away, forming a pocket which was filled with the usual greyish-green fœtor; the gums and jaw bone on that side were also affected.

It was a practically hopeless case, the man suffered intense pain, both from the growth itself and from the treatment; he followed the occupation of tram-driver, and was in such circumstances that he was compelled to continue his work; for a long time the treatment barely kept the growth in check. In the early part of October, however, another solution was given him (Chap. III, page 94) to wash away the fœtor and thus keep the open sore clean; it an-

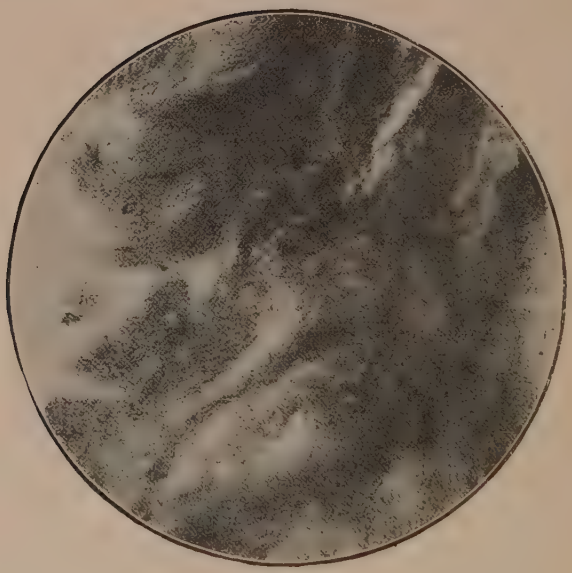


PLATE XII: × 4,225.

Carcinoma from the throat in the neighbourhood of the larynx. In this case tracheotomy had been twice performed to relieve the patient's breathing.

swered this purpose very satisfactorily, and in addition acted as a tonic; the pains were distinctly relieved and the case altogether improved; it suggested the advisability of trying this solution as an internal adjunct to the usual external hypodermic solution. On carrying this out in several other cases a marked improvement has resulted.

It is too soon yet to accept these results as conclusive, though it gives hope that further trials will confirm them.

In Mr. Neal's case, however, the improvement has been so great as to make the probability of his cure almost a certainty now. Considering the very serious nature and condition of the growth before, the contrast at the present time is very remarkable and encourages one to think that the twofold way of attacking cancer indicated on page 94 may yet become realized.

If this takes place it will probably be the furthest advance ever recorded in cancerous treatment.

It is improbable, too, that the scattered somewhat dubious instances of the reported spontaneous disappearance of cancer can give any result at all approaching it. Fortunately the man's own medical adviser and the medical attendant at the Salford Hospital, where he attended for fourteen weeks without help being possible, can bear testimony to the serious character of the growth and the correspond-

ing value of the treatment which has led to such a remarkable improvement.

It is this case especially which gave such an encouragement in the last modification of the treatment ; in previous cases of this nature the ulcerated masses have gradually sloughed away, this taking place even when cancerous growth has at the same time disappeared all round it.

But now there is no sign of ulceration, and although the ulcerated surface was a large one and sloughing had commenced, accompanied by the disgusting foetor, the pocket referred to above has practically filled up and become covered over again with the usual epithelial lining.

One point incidental to the modified treatment is of great importance ; this is the wonderful decrease in the amount of pain following the treatment, as well as the relief from the pain given by the growth itself.

A case of great interest is that of Mrs. H., an old lady over 70 years of age, of Brierfield near Burnley. She came for treatment after two operations—part of the hand was first removed, then the wrist on its recurrence ; after the second operation signs of extreme malignancy appeared. Though the treatment removed some growth in the arm, inflammation of a severe kind developed where the bone had been cut. It was considered advisable to remove the arm,

and this took place above the elbow. If the axiom of the medical world is correct, that cancer is incurable, it should now appear on the upper arm or some other part of the body ; as a matter of fact though the operation took place between one and two years ago the patient is alive and well, and quite free from growth. Is it too much to claim credit for the treatment for having produced this result ?

If the above axiom is correct there can be no hesitation in giving an affirmative answer to this question.

TABL

LIST OF SOME OF THE SUCCESSF

It will be noticed that the growths treated are as variable as possib in their character. The extreme malignancy of the greate number is unquestioned and leaves no room for doubt tha these, as well as a considerable number not included in the lis would have ended fatally, some of them months ago, had th treatment not been applied. The full names and addresses i

No.	Name.	Address.	Where Growth Situated.
1	Mrs. Clay . .	Birchfield Villas, Hebden Bridge	In axilla (right)
2	Mr. Storey .	Greenend, Wadsworth, Hebden Bridge	Ulcerated lower lip. Dense growth from lip t chin
3	H. . . .	Halifax	Front of both jaw bones gums affected Glands on both sides c face and under chin
4	B. . . .	Southport	Ulcerated lip. Chin to li filled up with growth
5	Mrs. Astbury.	Victoria Road, Hale, near Altrincham	Sternum, glands of nec axilla and about seat c amputated breast. Muscle joining arm to sternum
6	Mr. Imbery .	16, Bayswater Terrace, Halifax	Left cheek, which wa much distended

IV

OBTAINED BY THE TREATMENT.

a sufficient number of typical cases have been given. If for any satisfactory reason those withheld are required, they can be supplied. As a final word the writer would again emphasize on all sufferers the urgency of immediate treatment, and the danger of delay in cases of a similar nature.

Nature of Growth.	If operated upon. No. of Operations. Operating Surgeon.	General Remarks.
Sarcoma. Large sized, nodular. Some six or eight	One operation. Dr. Hodgson Wright, Halifax	First case, occurring 18 years ago, to which treatment was applied.
Epithelioma	One operation. Halifax Infirmary	Case very similar to that of Mr. Vickers and Mr. Pearce.
Epithelioma	One operation. Part of jaw bones removed. Leeds Infirmary	A somewhat difficult case to get under control.
Rodent ulcer	—	Röntgen rays tried unsuccessfully.
Sarcoma	Amputation of breast in 1906 in the Christy Hospital. Dr. Burgess, Manchester	On recurrence Dr. Burgess declared further operation impossible, in addition he stated condition of patient's health precluded this. Health now good.
Tumours of a cancerous nature	One operation	Thickness of cheek now normal.

TABLE IV

No.	Name.	Address.	Where Growth Situated.
7	Mr. Winskell .	10, Russell Street, Moss Side, Manchester	On both sides of tongue, glands on right side of face attacked
8	H. . . .	Parkinson Lane, Halifax	Shotty gland on neck
9	Mrs. Thwaites	8, Walker Street, King's Cross, Halifax	Left breast and right side
10	Mrs. Siddrons.	8, Warwick Road, Batley	Clavicle. Left arm and upper femur on both sides
11	Mr. Williams .	27, Lightbowne Road, Moston, Manchester	Rectum
12	Mr. Rogers .	19, Cumberland Street, Lower Broughton, Manchester	On right jaw
13	Mr. Westgate	27, Tipping St., Openshaw, Manchester	Breast bone

(*continued*)—

Nature of Growth.	If operated upon. No. of Operations. Operating Surgeon.	General Remarks.
Epithelioma	Two operations. 1905, Manchester Infirmary; 1906, Salford. Dr. Thorburn operated in Manchester Infirmary.	Nearly five years since commencement of growth.
Probably epithelioma		
Sarcoma	—	Growth of over 20 years' standing. Breast now normal size.
Sarcoma	One operation. Breast removed, further operation impossible	Case mentioned in text with further particulars.
Epithelioma	Coelotl opening made	—
Colloid cancer	—	He was so overjoyed on receiving relief that in an interview with a representative of *Manchester Dispatch* he said that it was like living in another world compared with the former painful existence.
Osteoma	Two operations	Hard periosteum had disappeared over a large patch, bone was fungating, hard surface now restored.

TABLE IV

No.	Name.	Address.	Where Growth Situated.
14	Mr. F. Taylor	Bell St., Newsholme Road, Huddersfield	Right cheek
15	M. . . .	Cornholme	Right breast
16	Mrs. Booth .	Range St., Openshaw, Manchester	In throat
17	Mrs. Gerrard .	134, St. Helier's Road, Bolton	In right axilla. Several flat pieces of nodules
18	Mr. Boydell	9 Newton Rd, Shepherd's Inn, Lowton	On tongue and submaxillary gland. Glands under ear, all on right side
19	H. . . .	Halifax	All along inside of cheek extending to bottom lip. Epithelial lining of cheek raised like large blisters
20	W. . . .	Leeds	Breast
21	S. . . .	Ilkley	Two glands in breast affected
22	Mr. Vickers .	9, Crow Court, Burnley	Ulcerated lower lip. Growth filling up hollow to chin
23	Mrs Hobbs	Oldham	Growth on cheek

(*continued*)—

Nature of Growth.	If operated upon. No. of Operations. Operating Surgeon.	General Remarks.
Lupus	Treatment with X rays, Huddersfield Infirmary	—
Sarcoma	Left breast removed	Later attacked on liver.
Adenoids	Adenoids once removed	—
Sarcoma	One operation in Bolton Infirmary	—
Epithelioma	One operation. Tongue partially excised, sub-maxillary gland removed.	Resembles Mr. Winskill's, Case 4, only much more serious, fully half of tongue having been removed. About five years since first attack.
Epithelioma	—	Removal a very tedious process but greatly accelerated on using second solution.
Sarcoma	—	—
Sarcoma	—	—
Epithelioma	One operation. Burnley Infirmary	Similar to Cases No. 2 and No. 40.
Sarcoma	—	Right malar bone lifted out of its place, swelling somewhat disfiguring the face. All traces of this now removed.

TABLE IV

No.	Name.	Address.	Where Growth Situated.
24	Mrs. Stead .	28, Stockport Rd., Ardwick, Manchester	Axilla (recurrence)
25	Miss Morgan .	Belmont House, 453, Oldham Road, Newton Heath, Manchester	Right breast. Nipple retracted, showing tubules affected. Growth also in axilla
26	P. . . .	Halifax.	Growth on rectum
27	S. . . .	West Vale	Lower lip
28	R. . . .	85, Mayer Street, Hanley	Rectum
29	W. . . .	Huddersfield	On nose
30	Mrs Kennerley	Hale	Three on left arm and one on right arm
31	D. . . .	Chorlton-cum-Hardy	In angle of nose
32	U. . . .	Todmorden	Right breast
33	F. . . .	Huddersfield	Right breast

(*continued*)—

Nature of Growth.	If operated upon. No. of Operations. Operating Surgeon.	General Remarks.
Sarcoma	Right breast removed	—
Sarcoma	Left breast removed in Manchester Infirmary	The nipple on right breast was retracted at the time of the operation. Growth developed in the glands; this was easily removed but that around nipple took some time longer.
Epithelioma	—	—
Ulcerated	—	—
Epithelioma	Coelotl opening made	Able to resume light work after treatment; case very similar to Mr. Williams'.
Rodent ulcer	—	Right side of nose gradually eaten away; growth begun nine years ago.
Fatty tumours	—	—
Rodent ulcer	Two operations	—
Sarcoma	—	—
Sarcoma	Left breast removed	—

TABLE IV

No.	Name.	Address.	Where Growth Situated.
34	Mrs. Hutchinson	Binn's Terrace, Nursery Lane, Ovenden, Halifax	Over right hip
35	Mr. Glasby	34, Walker Street, Thornhill Lees, Dewsbury	One behind skull. Widespread growth on neck on right side all about jugular vein. Shotty gland on left side in corresponding position,
36	W. . . .	Elland	In angle of right side of nose and eye
37	Mrs. Lane .	127, Bishop Street, Whalley Range, Manchester	Three growths as large as eggs over site of left breast, and one on gland of neck
38	S. . . .	Gorton	Began on left breast, passed across to right breast; intervening glands affected
39	D. . . .	Southport	Just above right hip
40	Mr. Pearce .	Starling Grove, Littleboro'	On lip extending nearly to chin with large fungoid growths on former
41	B. . . .	Leicester	On left breast, glands of axilla, on shoulder, neck behind the ear

(*continued*)—

Nature of Growth.	If operated upon. No. of Operations. Operating Surgeon.	General Remarks.
Soft fibroid tumour	—	—
Sarcoma	—	Examined at Leeds Infirmary, pronounced after diagnosis as a malignant growth.
Rodent Ulcer	—	—
Sarcoma	One operation	Seen after recrudescence by local doctor who stated that further operation was inadvisable.
Sarcoma	—	Growth widespread and malignant.
Fibroid tumour	—	Growth of long standing.
Epithelioma	—	Case mentioned in text.
Sarcoma	—	Röntgen rays tried unsuccessfully. Case considered inoperable by medical adviser.

TABLE IV

No.	Name.	Address.	Where Growth Situated.
42	Mrs. Barnett .	34, Clarence St., Moss Side, Manchester	Practically covered righ side after amputation o breast, so large on sit of latter as to sugges all of breast had no been removed
43	L.	Elland	Rectum
44	Mrs. Womersley	Top Victoria St., Moor End, Cleckheaton	On back, one near the spin and edge of sternum an second one higher u and near the shoulder
45	C.	Stockport	In breast, nipple affected
46	P.	Bradford	Anterior third of tongue
47	J.	Manchester	All glands left breast at tacked, running all alon glands of shoulder
48	I.	Nelson. . .	Between scapula and back bone
49	Mr. G. Sykes .	15, Wood St., Hill Top, Slaithwaite	Rectum, with soft fibroi tumour on top of skull
50	W. . . .	Bingley	From soft palate on lef side extending to an involving hard palate.

(*continued*)—

Nature of Growth.	If operated upon. No. of Operations. Operating Surgeon.	General Remarks.
Sarcoma	First operation 18 years ago. second operation 4 years ago	—
Epithelioma	—	Growth complicated by lead-poisoning.
Soft fibroid tumours	—	—
—	—	—
Epithelioma	—	—
Sarcoma	—	—
Fibroid tumour very large size	—	—
Epithelioma	—	—
Epithelioma	One operation	—

TABLE I

No.	Name.	Address.	Where Growth Situated.
51	L.	Bradford .	Right breast, nipple af- fected.
52	H.	Hawick	On left inguinal gland
53	L.	Huddersfield	On breast growing toward axilla
54	D.	Oxenhope	On left side of tongue Metastasis behind sku
55	Mrs. Wood .	Queen's Rd., Hali- fax	In angle of nose extendin from eye nearly to li with large ulcerate area.
56	Mrs. Shore .	Huddersfield . .	On both sides of nose
57	Mrs. Wilcox .	49, St. Mitchell St., Beswick, Man- chester	From seam at breast roun to back, muscle joinin arm to sternum, thre large lumps and scat tered growths

(*continued*)—

Nature of Growth.	If operated upon. No. of Operations. Operating Surgeon.	General Remarks.
—	—	Early stage, not much trouble in removal.
Sarcoma of some standing	—	—
Cancerous tumour	One operation, left breast removed. Huddersfield Infirmary	—
Epithelioma	—	—
Rodent ulcer	Treated unsuccessfully with X rays	This case has shown the advantage of the modified treatment, the rate of improvement quickly accelerating. At the beginning the eye was threatened and sooner or later would have been destroyed. The whole of the ulcerated surface, including a deep pit in the centre, is now filled up and almost skinned over.
Rodent ulcer	—	Gone abroad.
Sarcoma	One operation	An extreme case but early responded to treatment.

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